FINANCING

the

MONTANA STATE HIGHWAY SYSTEM

Prepared by

Jerry Stephens
Department of Civil and Agricultural Engineering
Montana State University
Bozeman, Montana

Prepared for
STATE OF MONTANA
DEPARTMENT OF HIGHWAYS
RESEARCH PROGRAM
in cooperation with the
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

December 1992

HE197
.S74
1992
COPY 2

HE197. S74 1992
COPY2

Department of Transportation
rch Library
Prospect Avenue
9620-1001

FINANCING THE MONTANA STATE HIGHWAY SYSTEM

CONTENTS

EXECUTIVE SUMMARY i

ACKNOWLEDGEMENTS vi

INTRODUCTION

General Remarks 1
Objective and Scope 1

EXISTING REVENUE STRUCTURE

General Remarks 4
Fuel Taxes 5
Gross Weight Fees 5
New Vehicle Sales Tax 12
Miscellaneous Motor Carrier Services Revenue 12
Coal Tax Trust Fund and Investment Related Revenues 12
Miscellaneous Accounts Receivable 13
Advanced Construction Interstate (ACI) Reimbursement 13
Supplement from Cash Balance 13
Comparison with Other States 13

PRESENT SITUATION, REVENUE VERSUS EXPENDITURES

General Remarks 16
Equity Ratios 17
Special Gross Weight Fees of 75, 55, and 16 Percent 24
Special Gross Weight Fees, Busses and Housetrailers 32
Revenue Required to Meet Expenditures 33

RECOMMENDED CHANGES IN THE REVENUE STRUCTURE

General Remarks 38
Rate Changes, Existing System 39
Power Unit Based Gross Weight Fee System 43
Changes to the Basic Structure of the Highway Finance System 48

CONCLUSIONS

Summary and Conclusions 54
Recommendations for Future Work 55

REFERENCES 56

Appendix A: Description of Vehicle Configurations 58
Appendix B: Truck Inventory and Use Survey Questionnaire 62
Appendix C: Special Fuel User Tax Return 71

Digitized by the Internet Archive
in 2019 with funding from
Montana State Library

https://archive.org/details/financingmontana1992unse

LIST OF FIGURES

Figure 1. Expenditure per Vehicle Mile as a Function of Average Operating ESAL Factor. 35
Figure 2. Expenditure per Vehicle Mile as a Function of Typical Maximum Gross Vehicle Weight. 36
Figure 3. Gross Weight Fees as a Function of Registered Gross Vehicle Weight. 47
Figure 4. Weight and Distance Charge as a Function of Registered Gross Vehicle Weight. 50

LIST OF TABLES

Table 1. Average Annual Revenue for the Highway System by Source, 1988 to 1991 (State Share Only). 4
Table 2. Summary of State Fuel Taxes as of June 1992. 6
Table 3. Effective Fuel Taxes by Vehicle Configuration, $0.20 per Gallon Tax. 7
Table 4. Montana Gross Weight Fee Schedule. 8
Table 5. Sources of Highway Revenue in Other States. 15
Table 6. Estimate of Cost Allocation by Vehicle Configuration. 18
Table 7. Description of Vehicle Configurations. 19
Table 8. State Highway System Mileage by Federal Aid System and Functional Class. 20
Table 9. Revenue Allocation Methodology. 20
Table 10. Average Annual Expenditures on the Highway System by Type, 1988 to 1991 (State Share Only). 22
Table 11. Expenditure Allocation Methodology. 22
Table 12. TIUS Vehicle Data Used in Special Fee Class Analyses. 26
Table 13. Summary of Special Fuel Use Survey Information Used in this Study. 26
Table 14. Analysis of Local Travel. 27
Table 15. Analysis of Off-the-Road Travel. 29
Table 16. Equity Based Special Fees for Present 75, 55, and 16 Percent Vehicles. 31
Table 17. Cost Responsibility, Secondary versus Primary and Interstate Highway Systems (1990). 33
Table 18. Highway Expenditures by Vehicle Configuration. 34
Table 19. Highway Expenditures by Vehicle Configuration in Other States. 37
Table 20. Influence of Changes in the Gasoline and New Vehicle Sales Taxes on Equity and Revenue Collected. 40
Table 21. Proposed Special Fees for Present 75, 55, and 16 Percent Vehicles. 42
Table 22. Proposed Power Unit Based Gross Weight Fee Schedule. 45
Table 23. Analysis of Proposed Power Unit Based Fee Schedule. 46
Table 24. Revised Finance System for Montana State Highways. 49

[illegible]

[illegible]

[illegible]

[illegible]

EXECUTIVE SUMMARY

The objective of this study was to review the system used to finance Montana state highways and recommend changes in that system, as appropriate, so that (a) the cost of the system is shared equitably between users, (b) the revenue available is sufficient to cover expenditures on the system, (c) the system is efficient to administer for both users and the state, and (d) the system is consistent with current practices across the nation. Note that throughout the study, only state related revenue and expenditures on the highway system were considered. While state highway expenditure patterns and attendant revenue requirements are influenced by federal activities, the state has only minimal control over these activities. The study does not address possible new funds that will be required from the state to take full advantage of any increase in federal highway funds available on a cost sharing basis under the federal Intermodal Surface Transportation Efficiency Act of 1991.

The study began with a review of present revenue sources for the highway system. Eighty-seven percent of highway revenues are directly derived from users in the form of fuel taxes, gross weight fees, new vehicle sales taxes, and miscellaneous permit fees, fines, etc. Thirteen percent of highway revenue is derived from non-user specific sources and includes interest from the Coal Tax Trust Fund and interest on investments maintained by the Department of Transportation. These sources of revenue were found to be consistent in type and magnitude with those in other states, and generally consistent with the concept that the highway system should primarily be financed by its users.

A review of highway revenue and expenditures by user type indicated that, on a general level, users are equitably sharing the cost of the highway system. A recently completed cost allocation study reported equity ratios (ratio of the percent of total highway revenue collected from a user group to the percent of total expenditures involved in providing that group with highway service) of 0.96, 1.11, and 1.07 for the broad categories of basic, intermediate, and heavy vehicles. Thus, basic vehicles, which consisted of motorcycles, passenger cars, pickups, vans, and recreational vehicles were found to be nominally underpaying their cost responsibility for the highway system. Intermediate vehicles, which consisted of 2 axle single units weighing less than 26,000 pounds, and heavy vehicles, which consisted of 3 and 4+ axle single units and all combination units, were found to be nominally overpaying their cost responsibility for the highway system.

Further study of the equity situation revealed considerable disparities in the share of highway costs borne by different types of vehicles within the broad categories of basic, intermediate, and heavy vehicles. Note that these results are less certain than those obtained on a more general level due to the nature and number of assumptions required to perform the refined analysis. The greatest disparity in user equity occurred in the heavy vehicle category, with a maximum equity ratio of 3.46

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

for 7+ axle triple trailers and minimum equity ratio of 0.70 for the configuration of 5 axle truck, full trailer. A study was also conducted of the equity of the special gross weight fees available to particular types of vehicles or vehicles engaged in certain activities. Under the present gross weight fee system, pole trailers, lowboys, and livestock haulers; haulers of ready-mix concrete and fertilizer; and many farm vehicles pay 75, 55, and 16 percent, respectively, of the full gross weight fees. These special fees were generally found to be lower than can be justified, based on a comparison of highway use by special fee vehicles with use by equivalent full fee paying vehicles. Recommended changes in these special fee rates consist of:

PROPOSED SPECIAL GROSS WEIGHT FEES

Vehicle Type	Weight	Existing Fee , as a Percent of Full Fees	New Fee, as a Percent of Full Fees
Pole Trailers, Logging Vehicles	Less than or equal to 24,000 pounds	75	90*
	Greater than 24,000 pounds	75	90
Lowboys	Less than or equal to 24,000 pounds	75	100*
	Greater than 24,000 pounds	75	100
Livestock Haulers	Less than or equal to 24,000 pounds	75	70
	Greater than 24,000 pounds	75	100
Ready-Mix Concrete	Less than or equal to 24,000 pounds	55	95*
	Greater than 24,000 pounds	55	95
Fertilizer	Less than or equal to 24,000 pounds	55	35+
	Greater than 24,000 pounds	55	80+
Farm Vehicles	Less than or equal to 24,000 pounds	16	35
	Greater than 24,000 pounds	16	80

* - presently, few vehicles of this type operate at this weight

+ - no information was found on road use by fertilizer trucks, these fees were simply assigned equivalent to those of farm vehicles

Revenues from gross weight fees will increase an estimated 10 percent (approximately $1,400,000 annually), if these fee changes are implemented.

Busses also presently are offered special highway use fees. Busses are charged for their use of the highway system based on number of seats rather than gross weight. A brief analysis of this situation indicated that gross weight fees for busses would be similar in magnitude to the present seat based charges. As the cost of providing highway service is more directly related to gross weight than to number of seats, busses simply should pay normal gross weight fees; seat based charges should be eliminated.

While the cost of the highway system is equitably shared between users (at least at a general level), insufficient total revenue is being collected to meet expenditures. A definite trend in the fiscal situation was observed, with a budget surplus of $15,005,460 from revenue collected in 1988 steadily eroding to a budget deficit of $39,238,516 in 1991. As the present finance system is fairly equitable at a broad level, one approach to addressing this situation is to simply raise user fees within the present system. Possible tax increases were explored that both generated additional revenue and improved user equity. After reviewing the various revenue sources, three alternatives were considered to meet these objectives, namely, (a) increasing the new vehicle sales tax, (b) increasing the gasoline tax (but not the special fuel tax), and (c) increasing both the gasoline and special fuel taxes and decreasing gross weight fees. The effects of any changes in these taxes were evaluated using the historical framework of the cost allocation study.

Increasing the new vehicle sales tax by 400 percent or the gasoline fuel tax (but not the special fuel tax) by 22.5 percent would have generated $18,500,000 in additional average annual revenue, an amount sufficient to cover the average annual deficit, replace the revenue from interest earnings on the cash balance maintained by the Department of Transportation, and replace all other non-sustainable income. Effectively, annual revenue derived from sustainable sources would have covered (and nominally exceeded) annual expenditures. Increasing the new vehicle sales tax 400 percent resulted in equity ratios of 1.00, 1.02, and 0.98 for basic, intermediate, and heavy vehicles, respectively. Equity ratios of 0.99, 1.14, and 0.98 were obtained for basic, intermediate, and heavy vehicles when the gasoline tax was increased by 22.5 percent. If gasoline and special fuel taxes are increased the same amount, approximate equity could be maintained by eliminating gross weight fees from intermediate vehicles and reducing gross weight fees paid by heavy vehicles. Following such a scenario, for example, with a fuel tax increase of 22.5 percent and a 40 percent reduction in heavy vehicle gross weight fees, equity ratios of 0.99, 1.07, and 1.00 were obtained for basic, intermediate, and heavy vehicles, respectively. In all cases, equity between vehicle configurations within the broad vehicle categories was generally unaffected by the changes described above.

While both the equity and revenue situations can be improved by simply increasing tax rates within the existing finance structure, an additional objective of this study was to investigate alternate methods of collecting user fees (particularly gross weight fees) that are more equitable, efficient and compatible with practices in other states than the present system of user fees. One recommendation consistent with all these objectives is the implementation of a power unit based gross weight fee system. Under such a system, fees are assessed using a single schedule based on gross vehicle weight, independent of whether the vehicle is a single unit or a combination. This system will replace the present system in which power units and trailers may be assessed separate fees using different schedules. Power unit based fee assessment is a reasonable approach to meeting highway cost responsibility, in that a trailer can only operate on the highway in conjunction with a power unit. Under the present fee system, an operator with multiple trailers for each power unit may pay full weight fees on trailers that are idle much of the time. The majority of states use a power unit based fee schedule.

The proposed power unit based fee schedule, presented below, is designed to generate fees for each vehicle configuration similar to those charged under the existing system. Thus, the impact of the fee system change on the user should be minimized. Gross weight revenue will decrease an estimated 8 percent (approximately $1,118,186) under the new schedule compared to the existing schedule. This decrease in revenue results primarily from a decrease in the fees charged 3 axle single units. Note that Montana's participation in the International Registration Plan, a program designed to simplify the payment and collection of motor vehicle fees from interstate carriers, may be contingent on the adoption of a power unit based fee system.

Over the next several years, consideration should be given to more fundamental revisions of the highway finance system than discussed thus far. A revised finance system that utilizes only revenue directly derived from users (considered to be the most secure, sustainable form of revenue) was developed herein. User fees in the revised system consist of an annual registration fee for passenger cars ($40), fuel taxes ($0.282 per gallon) for all vehicles, and gross weight fees for vehicles with weights in excess of 48,000 pounds. Careful consideration should be given to possible administrative costs, changes in gross receipts, user dissatisfaction, user evasion, etc., before implementing any or all of this finance system.

PROPOSED POWER UNIT BASED GROSS WEIGHT FEE SCHEDULE

Weight	Fee
Up to 6,000 lbs	$ 7.50
6,001 through 8,000	12.50
8,001 through 10,000	17.50
10,001 through 12,000	20.00
12,001 through 14,000	22.50
14,001 through 16,000	27.50
16,001 through 18,000	42.00
18,001 through 20,000	56.50
20,001 through 22,000	62.50
22,001 through 24,000	90.00
24,001 through 26,000	117.50
26,001 through 28,000	145.00
28,001 through 30,000	172.50
30,001 through 32,000	200.00
32,001 through 34,000	227.50
34,001 through 36,000	255.00
36,001 through 38,000	282.50
38,001 through 40,000	310.00
40,001 through 42,000	337.50
42,001 through 44,000	365.00
44,001 through 46,000	392.50
46,001 through 48,000	420.00
48,001 through 50,000	447.50
50,001 through 52,000	475.25
52,001 through 54,000	503.00
54,001 through 56,000	530.75
56,001 through 58,000	558.50
58,001 through 60,000	586.25
60,001 through 62,000	614.00
62,001 through 64,000	641.75
64,001 through 66,000	669.50
66,001 through 68,000	697.25
68,001 through 70,000	725.00
70,001 through 72,000	755.00
72,001 through 74,000	809.75
74,001 through 76,000	871.25
76,001 through 78,000	932.75
78,001 through 80,000	994.25
Per ton or part ton in excess of 80,000 lbs	994.25 + 61.50 per ton

ACKNOWLEDGEMENTS

The spirit of cooperation displayed by the personnel at the Montana Department of Transportation in conducting this study is gratefully acknowledged. The time given by Marcia Ala and David Galt in responding to questions that arose in the course of the study is especially appreciated. The continued support and encouragement provided by Robert Garber is gratefully acknowledged. Participation of Glenna Obie from Montana AAA and Ben Havdahl from the Montana Motor Carriers Association on the advisory committee for this effort is appreciated.

The report entitled Financing Modern Highways for Montana, authored by William Hall and his colleagues in 1956, reached many of the same conclusions that were arrived at in this study. The report was well prepared, and it provided an excellent background from which to begin this effort.

[illegible]

[illegible]

[illegible]

INTRODUCTION

General Remarks

Of the many services provided by government, all or part of the highway system traditionally has been financed by the people that use it. Generally, the majority of the revenue required to operate, maintain, and improve the system is collected from users in the form of vehicle registration fees, fuel taxes, gross weight fees, etc. This revenue is often supplemented by necessity or design by non-user specific funds, such as general fund appropriations, trust fund distributions, etc. In studying the highway finance system, three issues need to be considered, (1) is revenue being equitably collected from the various types of highway users, (2) is sufficient revenue being collected compared to the amount being expended on the highway system, and (3) is the revenue system practical to administer. While these issues were considered in formulating the existing finance structure, periodic review of the funding system is necessary as highway use and expenditure patterns change in response to changing economic, social, and technological conditions.

Objective and Scope

The objective of this project was to review the revenue structure for the state highway system and recommend changes to the structure as appropriate. The project was divided into two distinct tasks:

(1) to determine if highway users are equitably paying for the cost of providing them with highway service, and

(2) to recommend changes in the finance system as appropriate to improve equity between users, efficiency of administration, and consistency with current practice across the nation.

The first objective was completed by conducting a cost allocation study in which the relative equity of the highway finance system was determined with respect to three broad vehicle categories, namely, basic, intermediate, and heavy vehicles. The study found that the present system is generally equitable, with basic vehicles nominally underpaying for their use of the highway system relative to intermediate and heavy vehicles (Stephens, Barth, and Cloud, 1992). Subsequent work focused on the second objective, recommending changes to generally improve the system used to finance the Montana highway system. This report documents this effort. Several tasks were performed as a prelude to recommending changes to the highway finance system,

(1) a review was conducted of the sources of revenue that comprise the present system,

(2) the equity of user contributions under the present system was evaluated, and

(3) the adequacy of the present system in generating sufficient revenue to meet actual highway expenditures was determined.

Based on this information, possible changes to the finance system were recommended ranging from simply adjusting tax rates charged with-in the existing system to fundamentally revising the structure of the system.

While the present finance system was found to be equitable on a broad level, the system does not generate sufficient revenue to meet expenditures. A reasonable solution to this problem was to simply raise rates within the present system. Selective rather than across-the-board rate increases were considered, in an effort to simultaneously improve equity and generate increased revenue. These goals could be accomplished by increasing the new vehicle sales tax by 400 percent or the gasoline tax by 22.5 percent. Increasing both gasoline and special fuel taxes the same amount (22.5 percent) while simultaneously and significantly reducing gross weight fees was also found to increase revenue and improve equity. Additional revenue could also be raised by revising the special gross weight fees offered certain vehicles. The present special fees were found to under charge these vehicles compared to full fee paying vehicles.

With regard to improving the efficiency of the finance system and its consistency with practices in other states, the recommendation was made to adopt a power unit based gross weight fee system to replace the present system that considers power units and trailers independently. The power unit based system should be more equitable than the present system, easier to administer, and is consistent with current practice in the majority of states. A power unit based fee schedule designed to generate fees similar to those charged under the present system was proposed. Montana's continued participation in the International Registration Plan, a program designed to simplify both the payment of taxes by interstate vehicle operators and the collection of these taxes by the state, may be jeopardized if a power unit based schedule is not adopted.

Major improvements in the equity of user contributions at the vehicle configuration level will only be made by fundamentally changing the structure of the fee system. Such changes that can be practically administered will primarily impact those configurations within the broad categories of basic and intermediate vehicles. Before any broad changes of this kind are implemented, a detailed study should be performed of their impact on administrative costs (both to users and state agencies involved in their collection) and gross receipts. The revised finance system proposed herein derives all

revenue directly from users, as this type of revenue was judged to be more secure than sources of a more general nature. User fees consist of passenger car registration fees, fuel taxes, and a heavy vehicle gross weight taxes. The new vehicle sales tax would be eliminated. Passenger cars would pay for their share of highway expenditures using fuel taxes (at $0.282 per gallon) and an annual registration fee of approximately $40.00. Vehicles with gross weights less than 48,000 pounds would simply pay fuel taxes at a rate of $0.282 per gallon. Vehicles with gross weights in excess of 48,000 pounds would pay their cost responsibility for the highway system using fuel taxes and gross weight fees derived from weight and some measure of distance travelled.

This investigation considered only state related revenues and expenditures on the highway system. The federal government levies significant taxes on highway users and returns the associated revenue to the states to be used on highway projects (generally through matching funds construction programs). While state highway expenditure patterns and attendant revenue requirements are influenced by federal activities, the state has only minimal control over these activities. Thus, the adequacy of state finance system was addressed independent of that of the federal government.

The Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, passed by the federal government, may have a significant impact on the composition and funding of the Montana state highway system. The act modifies both the structure of the federal aid highway system and potentially increases the amount of federal money available to the state for highway projects. Federal money is generally available on a cost sharing basis, and thus Montana would have to find additional highway funds to take full advantage of any increase in federal funding. The impact of ISTEA was not addressed in this study, as this impact is still ill-defined, and it may be felt gradually.

EXISTING REVENUE STRUCTURE

General Remarks

The Montana highway system is financed by fees and taxes collected directly from users supplemented by public funds of a more general source. Direct user fees include gross weight fees, taxes on the sale of new vehicles, fuel taxes, and a variety of special permit fees (and fines). Non-user specific revenue includes disbursements related to the Coal Tax Trust Fund and interest on investments. The average annual revenue generated for the highway system from these sources for the 4 year interval from 1988 to 1991 is listed in Table 1. This system of financing is generally consistent with the method used to finance highways in other states, with the possible exception of the new vehicle sales tax.

Table 1. Average Annual Revenue for the Highway System by Source, 1988 to 1991 (State Share Only).

Type	Source	Avg. Annual Revenue, FY 88-91	Percent of Annual Revenue
Direct User Revenues (87 percent)	Gasoline Fuel Tax	$68,843,529	51
	Diesel Fuel Tax	21,091,179	17
	Gross Weight Fees	13,977,320	10
	Sales Tax on New Vehicles	6,271,411	5
	Misc. Fees Collected by G.V.W. Division	5,041,123	4
General Revenue (13 percent)	Coal Tax Trust Fund	7,845,968	6
	Bond Proceeds and Earnings	4,982,991	4
	Miscellaneous Accts Receiveable	3,189,008	2
	ACI Reimbursement	1,872,499	1
ALL	ALL	133,115,028	100

Source: Cost Allocation Study for the Montana State Highway System (Stephens, Barth, and Cloud, 1992)Fuel Taxes

Fuel Taxes

The state of Montana collects $0.20 per gallon of gasoline and special (diesel) fuel consumed by vehicles travelling on public highways (M.C.A. 15-70-204 and 15-70-321). Fuel taxes are the largest single source of revenue for the Montana state highway system, comprising 68 percent of all revenues (51 and 17 percent, from gasoline and diesel fuel, respectively). All states (and the federal government) levy taxes on fuel; a summary of state fuel tax rates is presented in Table 2. While the Montana fuel tax is only 14 percent above the mean tax charged across the country, it is 23 percent higher than the mean tax charged in the 4 surrounding states, and it exceeds the tax charged in 3 of these states.

Fuel taxes appear to be a simple device to equitably collect highway revenues from users, in that the amount of fuel consumed by a particular vehicle is indicative of the amount that the vehicle uses the highway. The effective tax paid per mile of travel by a particular type of vehicle can be calculated by dividing the fuel tax rate ($/gallon) by the fuel consumption rate (e.g., miles/gallon) for the vehicle. Estimated effective taxes presently paid per mile of travel by various vehicles are listed in Table 3. In general, heavier vehicles consume more fuel per mile travelled than lighter vehicles, and they pay higher fuel taxes per mile travelled than lighter vehicles. Heavy vehicles also generally place greater physical demands on the highway system than lighter vehicles, and thus they have a greater responsibility for costs per mile of highway than lighter vehicles, which is consistent with the relative magnitude of their fuel tax obligations. The relationship between fuel consumption and the cost responsibility of vehicles, however, is complex, and it can not be completely represented using a flat fuel tax rate. Referring to Table 3, for example, passenger cars and pickups (single unit, 2 axle, 4 tire) pay significantly different effective fuel taxes, although it will be seen later that the cost of providing them with highway service is similar. Thus, a flat fuel tax is by its nature inequitable to some degree in collecting highway user payments.

All highway users are eligible for a refund on the tax paid for fuel used in off-the-road vehicle travel and other non-public highway related uses. Refunds are based on actual gallons consumed or on miles driven and an estimate of the fuel consumption rate. Agricultural users may qualify for a flat refund of 60 percent of the tax paid on bulk gasoline purchases.

Gross Weight Fees

Recognizing that heavier vehicles generally place a higher physical demand on the highway system than light vehicles, special fees are levied on vehicles with a gross weight in excess of 6,000 pounds (M.C.A. 61-10-201,202,203). These fees are based on vehicle weight, independent of the specific distance travelled. The objective of these fees is to supplement fuel taxes in such a manner

Table 2. Summary of State Fuel Taxes as of June 1992.

State	Gasoline Tax ($/gal)	Diesel Tax ($/gal)	State	Gasoline Tax ($/gal)	Diesel Tax ($/gal)
Alabama	0.180	0.190	New Mexico	0.162	0.162
Alaska	0.080	0.080	New York	0.080	0.100
Arizona	0.180	0.180	North Carolina*	0.223	0.223
Arkansas	0.185	0.185	North Dakota	0.170	0.170
California	0.150	0.150	Ohio*	0.210	0.210
Colorado	0.220	0.180	Oklahoma	0.160	0.130
Connecticut	0.260	0.180	Oregon	0.220	0.220
Delaware	0.190	0.190	Pennsylvania	0.120	0.120
Florida*	0.116	0.126	Rhode Island*	0.260	0.260
Georgia	0.075	0.075	South Carolina	0.160	0.160
Hawaii	0.160	0.160	South Dakota	0.180	0.180
Idaho	0.210	0.210	Tennessee	0.214	0.174
Illinois	0.190	0.215	Texas	0.200	0.200
Indiana	0.150	0.160	Utah	0.190	0.190
Iowa	0.200	0.225	Vermont	0.150	0.160
Kansas	0.170	0.190	Virginia	0.177	0.162
Kentucky*	0.150	0.120	Washington	0.230	0.230
Louisiana	0.200	0.200	West Virginia*	0.155	0.155
Maine	0.190	0.200	Wisconsin	0.222	0.222
Maryland	0.235	0.235	Wyoming*	0.090	0.090
Massachusetts*	0.210	0.210			
Michigan*	0.150	0.150			
Minnesota	0.200	0.200			
Mississippi	0.180	0.180	AVERAGE	0.176	0.174
Missouri	0.130	0.110	MAXIMUM	0.260	0.235
MONTANA	**0.200**	**0.200**	MINIMUM	0.075	0.075
Nebraska*	0.217	0.217	FEDERAL	0.140	0.200
Nevada	0.205	0.220			
New Hampshire	0.180	0.180			
New Jersey	0.105	0.135			

* variable rate

Source: Highway Users Federation (1992)

Table 3. Effective Fuel Taxes by Vehicle Configuration, $0.20 per Gallon Tax.

Vehicle Description	Estimated Fuel Consumption Rate[#] (miles per gallon)	Effective Tax per Mile of Travel, 0.20 per Gallon Tax ($ per mile)	Normalized Effective Tax Rate
Passenger Cars	20.9	0.0096	1.00
Busses	6.4	0.0313	3.27
Single Unit, 2 Axle, 4 Tire	14.1	0.0141	1.48
Other Single Units	7.3	0.0274	2.86
Combinations	5.5	0.0364	3.80

[#] Source: Highway Statistics, 1990 (FHWA, 1990)the highway system. Approximately 10 percent

that the combined fuel tax and gross weight fee system equitably charges all vehicles for their use of the highway system. Approximately 10 percent of state highway revenue is derived from gross weight fees. The gross weight fees levied in Montana are generally viewed as a registration fee. Registration fees are classified as a "first structure" tax. Fuel taxes are referred to as the "second structure" tax, and the "third structure" tax is commonly defined as a tax based on both weight and distance travelled. Montana gross weight fees do exhibit some traits of a "third structure" tax, since by design they generally reflect the tax liability per mile travelled for a particular weight of vehicle.

The gross weight fee schedule for Montana is presented in Table 4. Fees are paid on the registered maximum gross weight of the vehicle for single units (Schedule I). Combination vehicles can pay fees based on the registered maximum gross weight of the individual units comprising the combination (Schedules I and II) or on the total weight of the combination (Schedule III). The latter option is a form of power unit based fee system, in which the primary gross weight fee is levied on the power unit for the gross weight of the entire combination. As of 1988, power unit based fee schedules had been adopted in 42 states (FHWA, 1988), and this type of fee system is actively encouraged in the International Registration Plan (Galt, 1992). The International Registration Plan (IRP) is a voluntary (soon to become mandatory) agreement between jurisdictions that establishes a uniform procedure for the collection of vehicle fees from out-of-state based motor carriers. Due to the volume of interstate vehicle operation, it is desirable to simplify the process involved in meeting the tax obligations in every state in which a vehicle operates. This simplification is of benefit both to the vehicle operators (Havdahl, 1992) and the state agencies responsible for collecting these taxes (Galt, 1992).

Table 4. Montana Gross Weight Fee Schedule.

Schedule I. Motortrucks and Truck Tractors	
Weight	Fee
Up to 6,000 lbs	$ 7.50
6,001 through 8,000 lbs	12.50
8,001 through 10,000 lbs	17.50
10,001 through 12,000 lbs	20.00
12,001 through 14,000 lbs	22.50
14,001 through 16,000 lbs	27.50
16,001 through 18,000 lbs	37.50
18,001 through 20,000 lbs	50.00
20,001 through 22,000 lbs	62.50
22,001 through 24,000 lbs	93.75
24,001 through 26,000 lbs	125.00
26,001 through 28,000 lbs	156.25
28,001 through 30,000 lbs	206.25
30,001 through 32,000 lbs	262.50
32,001 through 34,000 lbs	318.75
34,001 through 36,000 lbs	375.00
36,001 through 38,000 lbs	431.25
38,001 through 40,000 lbs	487.50
40,001 through 42,000 lbs	543.75
Over 42,000 pounds and within the weight limits specified in 61-10-101 through 61-10-110	62.50 per ton or fraction thereof

Source: Montana Code Annotated, 61-10-201 (M.C.A. 1991)

Table 4. Montana Gross Weight Fee Schedule, continued.

Schedule II. Trailers Other Than House Trailers	
Weight	Fee
Up to 2,500 lbs for personal use--	Exempt
Up to 2,500 lbs for commercial use	$ 3.75
2,501 through 6,000 lbs	5.00
6,001 through 8,000 lbs	15.00
8,001 through 10,000 lbs	17.50
10,001 through 12,000 lbs	20.00
12,001 through 14,000 lbs	22.50
14,001 through 16,000 lbs	27.50
16,001 through 18,000 lbs	37.50
18,001 through 20,000 lbs	50.00
20,001 through 22,000 lbs	62.50
22,001 through 24,000 lbs	93.75
24,001 through 26,000 lbs	125.00
26,001 through 28,000 lbs	156.25
28,001 through 30,000 lbs	206.25
30,001 through 32,000 lbs	262.50
32,001 through 34,000 lbs	318.75
34,001 through 36,000 lbs	375.00
36,001 through 38,000 lbs	431.25
38,001 through 40,000 lbs	487.50
40,001 through 42,000 lbs	543.75
Over 42,000 pounds and within the weight limits specified in 61-10-101 through 61-10-110	62.50 per ton or fraction thereof

Source: Montana Code Annotated, 61-10-202 (M.C.A., 1991)

Table 4. Montana Gross Weight Fee Schedule, concluded.

Schedule III. Combinations	
Weight	Fee
Up to 42,000 lbs	$ 571.00
42,001 through 44,000 lbs	631.00
44,001 through 46,000 lbs	691.00
46,001 through 48,000 lbs	752.00
48,001 through 50,000 lbs	812.00
50,001 through 52,000 lbs	871.00
52,001 through 54,000 lbs	931.00
54,001 through 56,000 lbs	992.00
56,001 through 58,000 lbs	1,052.00
58,001 through 60,000 lbs	1,112.00
60,001 through 62,000 lbs	1,172.00
62,001 through 64,000 lbs	1,233.00
64,001 through 66,000 lbs	1,293.00
66,001 through 68,000 lbs	1,352.00
68,001 through 70,000 lbs	1,412.00
70,001 through 72,000 lbs	1,473.00
72,001 through 74,000 lbs	1,533.00
74,001 through 76,000 lbs	1,593.00
76,001 through 78,000 lbs	1,653.00
78,001 and over	65.50 per ton or fraction thereof

Source: Montana Code Annotated, 61-10-203 (M.C.A., 1991)

Presently, 43 states and Alberta participate in the IRP (Galt, 1992). For interstate carriers based in Montana, any payments due these states can be made through the Motor Carriers Services Division of MDT, which forwards these payments as appropriate to the states in question. Similarly, payments due Montana from out-of-state based carriers can be made through their home state agencies, which forward these payments to Montana.

Montana offers reduced motor vehicle fees to users engaged in businesses that involve extensive local road, off-the-road, and/or seasonal operation. Pole trailers, lowboys, and livestock haulers; haulers of ready-mix concrete and fertilizer; and certain farm vehicles pay gross weight fees of 75, 55, and 16 percent of full fees (M.C.A. 61-10-204,205,206). Special fees for farm vehicles, at least, are common across the country. A survey of motor vehicle fee schedules nationwide found that 42 states offer farm vehicles special weight fees (FHWA, 1988). Twelve of these states express the fee as a percentage of the full fee. The special farm fee offered by Montana is the lowest farm fee among these states. The farm fees in the other states ranged from 25 to 70 percent of the full fee, with a median value of 50 percent. Oregon offers special fees to log trucks, sand and gravel trucks, and wood chip trucks, in addition to farm vehicles. The fraction of full fees paid by these vehicles is difficult to determine, even after reviewing Oregon's fee structure, but the fees are lower than required to meet the cost of providing highway service to these vehicles (Oregon DOT, 1986).

Busses and house trailers also pay special gross weight fees (M.C.A. 61-10-207,208). Busses pay $7.00 per seat (in lieu of gross weight fees), exclusive of the first seven seats and the operator's seat (MCA, 1992, 61-10-207). The relationship between this fee structure and highway cost responsibility is unclear. House trailers pay $0.75 per foot of length in addition to normal gross weight fees. The basis for this fee is also uncertain.

Supplementary vehicle taxes are imposed in Montana based only on vehicle weight, similar in form to the practice in a majority of states. Some states have adopted third structure taxes that explicitly consider both weight and distance travelled. Common systems of this type are weight-distance and ton-mile taxes. Under a weight distance tax, a tax rate per mile of travel is set for each vehicle, generally based on the registered gross vehicle weight; the tax liability of a particular vehicle is calculated as the product of this tax rate and the reported miles of travel. Proponents of this system argue that it is a more equitable approach to charging for highway services than simply using a constant fee at each weight level, independent of the miles travelled. Opponents of weight-distance taxes believe that the cost of administering the system are unacceptably high for both the state and motor vehicle operators. Evasion is also viewed as a problem with weight-distance systems, in that the system relies on operator supplied mileages, which may be underreported.

Ton-mile tax systems further refine the theoretical concept to consider the weight hauled and miles travelled on each individual vehicle trip. Total tax liability is the sum of the fees due for each trip, which are calculated as the product of the rate for the weight of the vehicle for that trip and the length of the trip. Ton-mile tax systems are generally acknowledged to involve extensive reporting requirements for operators and audit activities by the state.

As of 1989, 40 states reportedly used weight-only based systems (including Montana); and 10 states used some form of weight and distance based tax system (Maine Department of Transportation, 1989). Since that time, Arkansas, Nevada, Ohio, and Wyoming have replaced their weight and distance based systems with weight only systems, and Colorado has simplified their weight and distance fee system so that it considers weight and broad categories of distance traveled on an annual basis. In discussions with various personnel in these states, reasons cited for repealing these weight and distance taxes include legal challenges of specific implementations of this form of tax, high costs of collecting and enforcing such taxes, high tax evasion rates, and the inability to collect such taxes through the IRP (Arkansas IRP Unit, 1992; Gosnell, 1992; Hulls, 1992; Ohio Bureau of Permits, 1992; Wyoming Overweight Loads Office, 1992).

New Vehicle Sales Tax

In consideration of the right to use the highways of the state, a sales tax is levied on new vehicles purchased (or originally titled) in Montana (M.C.A. 61-3-502). These fees constitute only 5 percent of total highway revenues. The fees range from 3/8 to 1 1/2 percent of the list price of the vehicle. From a cost responsibility perspective, the equitability of these fees is questionable. The cost of providing highway service to a luxury car, for example, versus a more utilitarian version of the same vehicle may be very similar, while the new vehicle sales tax paid on each vehicle are significantly different.

Miscellaneous Motor Carrier Services Revenue

A variety of additional user fees are collected to support the highway system, primarily from intermediate and heavy vehicles. These fees consist of overweight and oversize permit fees, income from fines, etc. Collectively, these fees constitute 4 percent of the total revenue for the highway system.

Coal Tax Trust Fund and Investment Related Revenues

The Coal Tax Trust Fund and other investment related income are not directly associated with specific highway users. While this type of income accounted for 6 percent of the revenue for the

highway system between 1988 and 1991, future income from these sources may be reduced. Forty percent of the income of this type was interest earnings on the unspent cash balance that presently exists in the highway account. This cash balance, and the attendant interest earnings, decreased each of the last two years, and they are expected to further decrease in future years as annual highway expenditures continue to exceed revenues (MDT, 1991). Additionally, the Coal Tax Trust Fund income for 1993 has been diverted by the state to other purposes. Further note that the basic contribution from the Coal Tax Trust Fund fluctuated in the years 1988 to 1991, from $10,156,957 to $6,054,941. This contribution is expected to be a constant amount of $4,572,000 beginning in 1993 (MDT, 1991a).

Miscellaneous Accounts Receivable

This category of revenue consists of several relatively small sources of highway monies (individually averaging less than 1 percent and collectively less than 3 percent of total revenues) not included in the categories above. Items grouped under this heading include proceeds of property sales and leases, reimbursements for work done for cities and counties, and annual accounting adjustments.

Advanced Construction Interstate (ACI) Reimbursement

The ACI revenue shown in Table 1 consists of a reimbursement received from the federal government for state monies spent to accelerate construction of the interstate highway system. The last installment of the reimbursement was received in 1988. Thus, this "revenue" will be unavailable in future years.

Supplement from Cash Balance

Average annual expenditures exceeded revenues during the four year period from 1988 to 1991. The deficit, annually averaging $8,970,479, was covered by drawing on the cash balance accumulated by MDT, primarily from the sales of bonds at and before 1987. This supplemental income from the department's cash balance is 7 percent of the average revenue that was collected annually during the study period. Note that present projections indicate the cash balance will be steadily drawn down for the next few years until it is exhausted by the end of FY 1995 (MDT, 1991a).

Comparison with Other States

A comparison of the sources of highway revenue in Montana with those in other selected states is presented in Table 5. Highway revenues in Montana are not inconsistent in nature and

magnitude to those in some other states. Note that the information presented in Table 5 should only be viewed from a very general perspective. The revenue systems used in the various states to finance highways are both complex and varied. Revenue referred to by the same title can vary in source and eventual use (highway versus non-highway) from state to state.

Table 5. Sources of Highway Revenue in Other States.

State	Percent of Revenue by Source						
	Registration Fees	Fuel Taxes	Motor Carrier Fees	Other			Total
Montana	0	68	14	Sales Tax 5	Non-User Specific 13		100
Nevada (1986)	17	55	16	Highway P. 5	Drivers L. 4	Miscel. 3	100
Wyoming (Wilbur Smith and Associates, 1980)	11	19	28	Non-User Specific 42			100
California (Sydec, 1987)	38	38	20	Miscel. 4			100
Maine (1989)	18	68	*	Turnpike 8	Miscel. 6		100
Oregon (1986)	10	48	42				

* Weight related component included in Registration Fees

PRESENT SITUATION, REVENUES VERSUS EXPENDITURES

General Remarks

The equity of the existing finance structure and the general fiscal condition of the state highway system had to be evaluated before changes to this system could be reasonably recommended. The basic equity of the finance structure was addressed in a cost allocation study recently completed for the state highway system (Stephens, Cloud, and Barth, 1992). This study found that the payments made by various users of the highway system were fairly equitable based on the actual cost of providing them with highway service. In the study, equity ratios of 0.96, 1.11, and 1.07, respectively, were determined for basic, intermediate, and heavy vehicles, where this ratio represents the percent of revenue allocated to each user class divided by the percent of expenditures related to providing that class of vehicles with highway service. Thus, basic vehicles, which consisted of motorcycles, passenger cars, vans, pickups, and recreational vehicles, were found to be nominally underpaying for their use of the highway system compared to other users. Intermediate vehicles, which included 2 axle single units and busses, were found to be nominally overpaying for their use of the highway system compared to other users. Heavy vehicles, which consisted of three or more axle single units and all combinations, were also found to be nominally overpaying for their use of the highway system compared to basic vehicles.

Equity ratios only indicate relative underpayment or overpayment for the highway system; over the four year period considered in the cost allocation study (1988 to 1991), expenditures exceeded revenues by 7 percent. This revenue shortfall was made up by drawing on MDT's accumulated cash balance. A definite trend in the fiscal situation was observed, with a budget surplus of $15,005,460 in 1988 steadily eroding to a budget deficit of $39,238,516 in 1991. Thus, while user fees are being equitably collected (on a general level), total collections are insufficient to meet expenditures.

In this investigation, the results of the cost allocation study were refined to obtain equity ratios for the various vehicle configurations included in the broad categories of basic, intermediate and heavy vehicles. The resulting equity ratios ranged from 0.70 for a five axle truck, full trailer to 3.46 for a 7+ axle triple trailer. These values are considerably less certain than the equity ratios determined for the major vehicle classes, due the number and nature of the additional assumptions that had to be made in their determination, particularly with regard to revenue allocation. Assignment of gross weight fees and new vehicle sales tax

revenue to the various vehicle configurations comprising the intermediate and heavy vehicle categories was a particularly uncertain task.

The equity of the special gross weight fees available to certain vehicles were also investigated herein. In general, these fees were found to be lower than justified based on an analysis of various data on highway use.

With respect to generating sufficient revenue to meet highway expenditures, the unit cost of providing each vehicle with highway service was calculated. This cost represents the revenue that must be collected from each user to finance the highway system presuming users are satisfied with the level of service being provided and its cost.

Equity Ratios

Equity ratios estimated for the various types of vehicles operating on Montana highways are presented in Table 6. Equity ratios were calculated for a total of 20 different vehicles configurations that collectively constitute the broad categories of basic, intermediate, and heavy vehicles. These ratios were calculated by extending the data and methodology employed in the initial cost allocation study. Revenues and expenditures identified in that study were assigned to individual vehicle configurations rather than broad categories of vehicles. Note that revenue allocation at the vehicle configuration level (particularly within the broad category of heavy vehicles) was a difficult and uncertain process. Conversely, within the assumptions implicit in the allocation methodology used, the allocated expenditures listed in Table 6 are believed to be relatively accurate. The equity ratios, however, are afflicted with the same uncertainties as the revenue allocations from which they were calculated.

The 20 vehicle configurations considered in this study are described in Table 7 and pictured in Appendix A. These particular configurations (which cover all vehicles in the traffic stream) were selected to be consistent with the configurations for which traffic data are collected by MDT. Some of the characteristics of these vehicles are presented in Table 7. Data available on the vehicles included average operating weight, ESAL factor, and vehicle miles travelled by vehicle configuration for each unit of the state highway system for 1988, 1989, and 1990 (Traffic Data Collection Section, MDT, 1992). An overview of the state highway system mileage is presented in Table 8.

The cost allocation process consisted of assigning all state highway revenues and expenditures to the various user configurations. A summary of the revenue allocation methodology is presented in Table 9. Conceptually, allocation of user derived revenues was

Table 6. Estimate of Cost Allocation by Vehicle Configuration.

Description	Percent of Revenue	Percent of Expenditures	Equity Ratio[+], Individual Vehicle Configurations	Equity Ratios[+], Broad Vehicle Categories
Basic Vehicles				
Pass. Car	34.3	39.4	0.87	0.96
Light Truck,Vans,RV	29.3	26.7	1.10	
Intermediate Vehicles				
Busses	0.7	0.5	1.52	1.11
2 Axle/4 Tire	3.9	3.4	1.14	
2 Axle/6 Tire	5.7	5.4	1.05	
Heavy Vehicles				
3 Axle, Single Unit	2.8	2.9	0.96	1.07
4+Axle, Single Unit	0.2	0.2	1.36	
3 Axle Semi	0.3	0.2	1.25	
4 Axle Semi	1.0	0.6	1.69	
5 Axle Semi	15.8	14.0	1.13	
6 Axle Semi	1.3	1.6	0.82	
3 Axle Trk, Full Tr	0.2	0.1	2.29	
4 Axle Trk, Full Tr	0.5	0.3	1.80	
5 Axle Trk, Full Tr	0.4	0.6	0.70	
6 Axle Trk, Full Tr	0.6	0.7	0.89	
5 Axle Semi, Full Tr	0.4	0.3	1.44	
6 Axle Semi, Full Tr	0.2	0.2	1.09	
7 Axle Semi, Full Tr	1.3	1.6	0.80	
8 Axle Semi, Full Tr	1.2	1.4	0.89	
7+ Axle, Triple Tr	0.2	0.1	3.46	
Total	100	100	-	1.00

[+] Equity ratio defined as Percent of Revenue divided by Percent of Expenditures

Table 7. Description of Vehicle Configurations.

Description	Average Operating Weight, lbs	Maximum Gross Weight, lbs	No. of Axles	Average Operating ESALs
Basic Vehicles				
Pass. Car,	2,500*	6,000	2	0.0002*
Pickup, Vans, RV	6,000*	8,000	2	0.0023*
Intermediate Vehicles				
Busses	25,000*	32,000	3	0.257
2 Axle/4 Tire	12,000*	14,000	2	0.034
2 Axle/6 Tire	16,586	26,000	2	0.344
Heavy Vehicles				
3 Axle, Single Unit	16,666	46,000	3	0.607
4+Axle, Single Unit	31,981	54,000	4+	1.392
3 Axle Semi	28,534	48,000	3	0.643
4 Axle Semi	29,717	62,000	4	0.548
5 Axle Semi	63,245	80,000	5	1.527
6 Axle Semi	75,271	90,000	6	1.691
3 Axle Trk, Full Tr	18,658	26,000	3	0.314
4 Axle Trk, Full Tr	23,573	32,000	4	0.289
5 Axle Trk, Full Tr	69,152	84,000	5	1.965
6 Axle Trk, Full Tr	71,553	100,000	6	1.468
5 Axle Semi, Full Tr	62,105	80,000	5	1.980
6 Axle Semi, Full Tr	60,842	90,000	6	1.414
7 Axle Semi, Full Tr	77,133	120,000	7	1.825
8 Axle Semi, Full Tr	89,548	130,000	8	1.574
7+ Axle, Triple Tr	89,261	118,000	7+	2.498

* these values were estimated, all other values are based on traffic data prepared by the Traffic Data Collection Section, MDT (1992) for the initial cost allocation study

Table 8. State Highway System Mileage by Federal Aid System and Functional Class.

Federal Aid System	Functional Class					
	Interstate	Principal Arterial	Minor Arterial	Major Collector	Off System	TOTAL
Interstate						
Rural	1144					1144
Urban	47					47
Total	1191					1191
Primary						
Rural		2102	3249			5351
Urban		101				101
Total		2203	3249			5452
Secondary				4756		4756
Urban		70	190	101		361
Off System					1139	1139
TOTAL	1191	2273	3439	4857	1139	12899

Source: 1991 Montana Federal Aid Road Log (MDT, 1991b)

Table 9. Revenue Allocation Methodology.

Source of Revenue	Allocation Methodology
Gasoline Fuel Tax	To all vehicles based on expected mpg and VMT
Diesel Fuel Tax	To all vehicles based on expected mpg and VMT
Gross Weight Fees	To various vehicle categories as collected
Sales Tax on New Vehicles	To various vehicle categories as collected
Misc. Fees Collected by Motor Carrier Services	To intermediate and heavy vehicles based on AMT
Coal Tax Trust Fund	To all vehicles based on VMT
Bond Proceeds and Earnings	To all vehicles based on VMT
Miscellaneous Accts Receiveable	To all vehicles based on VMT
ACI Reimbursement	To all vehicles based on construction cost responsibility
Supplement from Cash Balance	To all vehicles as contributed to cash balance

straightforward, in that these revenues were assigned to the various types of vehicles in the manner in which they were collected. Practically, allocation of much of the revenue was complicated by the nature of the available revenue information. Records generally were available only on the total amount of fees collected, without identifying the source by vehicle category or configuration. This situation existed for the fuel tax, gross weight fee, and new vehicle sales tax revenue. Indirect methods were used in each case to allocate these revenues to the various users. Revenues derived from general sources were allocated based on vehicle miles travelled.

The total fuel tax revenue was allocated to each vehicle configuration based on their projected fuel usage. This usage was calculated from traffic data on miles travelled and estimates of fuel consumption rates for each vehicle configuration (see Table 3). Gross weight fee data was available separately for vehicles that operated only in Montana, vehicles engaged in interstate operation based in Montana, and interstate vehicles based out-of-state. The available data generally consisted of the total amount collected from each of the aforementioned categories (by study year), supplemented with limited or no information on the specific vehicles involved. Within each broad vehicle category, this revenue was allocated to specific vehicle configurations based on the estimated number of vehicles of each configuration operating on the highways, weighted by the gross weight fee the vehicle would pay if registered for a full year at a typical maximum allowable gross weight. The data available on the new vehicle sales tax revenue consisted of the total amount collected from cars and motorcycles; vehicles under 26,000 pounds; vehicles over 26,000 pounds; and tractors. Truck revenue was generally allocated in the same proportion that the various vehicle configurations were observed in the traffic stream.

The Coal Tax Trust Fund revenue and bond interest monies, which were not collected from specific users, were allocated to the various vehicle configurations based on their relative miles traveled on the highway system. The assumption was made that these monies were intended to be used for the equal benefit of all users. Note that miscellaneous revenues were also allocated to the various vehicle configurations based on vehicle miles travelled. The supplement from the cash balance, required in 1990 and 1991, was allocated to each configuration in the manner in which the cash balance was accumulated (see Stephens, Barth, and Cloud, 1992, for more detail on this process).

Expenditures on the highway system, and the methods used in their allocation to the various vehicle configurations, are summarized in Tables 10 and 11, respectively. The expenditures assigned to each vehicle represent the cost associated with providing that type

Table 10. Average Annual Expenditures on the Highway System by Type, 1988 to 1991 (State Share Only).

Item	Avg. Annual Expenditures, FY 88-91	Percent of Annual Expenditures
Motor Carrier Services Division Operations	$3,406,492	2
General Operations	7,496,138	5
Pre-Construction	5,055,263	4
Construction	63,098,174	44
Maintenance	43,358,455	31
Bond Interest	9,966,107	7
Dept. of Justice	10,384,727	7
Misc. Expenditures	(663,408)	
TOTAL	142,101,946	100

Source: Cost Allocation Study for the Montana State Highway System (Stephens, Barth, and Cloud, 1992)

Table 11. Expenditure Allocation Methodology.

Item	Allocation Methodology
Motor Carrier Services Division Operations	To non-basic vehicles, based on axle miles (cost to basic vehicles estimated to be less than 1/2 of 1 percent of total (Galt, 1992))
General Operations	To all vehicles based on VMT
Pre-Construction	To all vehicles based on VMT
Construction	Minimum facility to all vehicles based on VMT, Remainder to all vehicles based on ESAL-M
Maintenance	Primarily VMT to all, pavement costs based on environment vs. traffic related deterioriation, environment VMT to all, traffic ESAL-M to all
Bond Interest	Allocated in same fashion as Construction costs
Dept. of Justice	To all vehicles based on VMT
Misc. Expenditures	To all vehicles based on VMT

of vehicle with highway service, and thus are often referred to as the cost responsibility of that vehicle for the highway system. In the allocation process, costs of activities that were independent of the specific vehicles being served were allocated to all users based on vehicle miles traveled. Costs of this type included expenditures on general administration and operations, and the costs of many construction and maintenance activities. In the construction area, for example, the costs of installing storm drains were allocated to the various vehicle configurations based on vehicle miles travelled. Costs of activities that were dependent on some aspect of the vehicles being served were allocated, as possible, based on that aspect of the vehicle. With regard to roadway costs (base and wearing surface), for example, the cost of a minimum facility to carry basic vehicles was shared by all users based on vehicle miles travelled. The cost of any additional pavement or base thickness was allocated based on ESAL miles of travel (vehicle ESAL factor times VMT).

Equity ratios for each vehicle configuration were calculated by dividing the percentage of revenue by the percentage of expenditures allocated to that configuration. These ratios are reported in Table 6. In viewing these ratios, it is important to note that revenue allocation with-in the broad category of heavy vehicles (and to a lesser extent, with-in intermediate vehicles) was an uncertain process. The revenues allocated to most of the heavy vehicle configurations constituted less than 2 percent of the total revenue, thus any small absolute error in the allocation process was a potentially large error in the relative magnitude of the results. The allocated expenditures listed in Table 6 are believed to be relatively accurate (within the assumptions inherent in the allocation methodology adopted). The expenditure and traffic data used herein appeared to be of good quality. The equity ratios, however, are afflicted with the same uncertainties as the revenue allocations from which they were calculated.

The reported equity ratios vary from 0.70 to 3.46 for a 5 axle truck, full trailer and a 7+axle, triple trailer, respectively. The variations in the equity ratios appear to be non-systematic. Notably, the ratios do not steadily increase or decrease as a function of maximum gross weight, which might imply a bias in the existing gross weight fee schedule. The average of the equity ratios weighted by the percent of total expenditures is 1.01 with a standard deviation of 0.09. This statistic supports the conclusion that the overall balance of expenditures and revenues is generally equitable among those vehicles that account for the majority of the expenditures on the highway system.

For the broad classes of basic, intermediate, and heavy vehicles, equity ratios of 0.96, 1.11, and 1.07 were previously determined (Stephens, Barth, and Cloud, 1992). Within the

category of basic vehicles, relative underpayment of cost responsibility by passenger vehicles (equity ratio of 0.87) was somewhat compensated for by relative overpayment by pickups, recreational vehicles, and vans (equity ratio of 1.10). This situation results in part from the high fuel economy realized by passenger cars and thus the relatively low effective fuel tax rate for these vehicles. All intermediate vehicle configurations were found to be relatively overpaying their highway cost responsibility. The greatest disparity in equity between vehicle configurations within a category occurred for heavy vehicles. The equity ratio calculated for 7+ axle triple trailers of 3.46 is particularly pronounced. This situation may result in part from the fact that gross weight fees for triple trailers are calculated following a special procedure (M.C.A. 61-10-210), which it will be seen results in these vehicles paying relatively higher gross weight fees than other combination vehicles (see Figure 3). Additionally, state expenditures on providing highway service to 7+ axle triples may be lower than for other vehicles (see Table 18), as such vehicles are restricted to operate on the interstate system, on which construction work is heavily subsidized by the federal government.

Special Gross Weight Fees of 75, 55, and 16 Percent

The state of Montana presently offers special gross weight fees to vehicles engaged in certain types of work, as previously mentioned. Pole trailers, lowboys, and livestock haulers; haulers of ready-mix concrete and fertilizer; and many farm vehicles pay 75, 55, and 16 percent, respectively, of the full gross weight fees. Justifications advanced for these fee reductions included:

(1) these types of vehicles operate extensively on local roads (Hall, et.al., 1956) and off-the-road (Galt, 1992). Hall found that expenditures by the state highway department on local roads were significantly less than those on primary roads, resulting in lower state related cost responsibilities for highway service for vehicles that operate predominantly on such roads. Vehicles should incur no highway cost responsibility to the state for off-the-road operation.

(2) these types of vehicles are only used on a seasonal basis (Galt, 1992). Thus, the annual gross weight fees paid by these vehicles should be reduced compared to vehicles that operate throughout the year. Note that this rational is only valid for vehicles with registered maximum gross weights less than or equal to 24,000 pounds, in that heavier vehicles have the option of paying gross weight fees by the month, quarter, or year (M.C.A. 61-10-209).

To assess the reasonableness of the special fee classes for pole trailers, lowboys, and livestock haulers; haulers of ready-mix concrete and fertilizer; and many farm vehicles, available information on the conditions upon which these fees were believed to be based was analyzed. The magnitude of the special fees paid by these vehicles should reflect the proportion of their travel on state highways relative to that of full fee paying vehicles, and, for the case of vehicles required to pay for a full year, the proportion of the year the vehicle is operational. Vehicles with maximum gross weights less than or equal to 24,000 pounds (approximately corresponding to the categories of light and intermediate vehicles) are only allowed to register annually; thus, both issues need to be considered for these vehicles. For vehicles with maximum gross weights that exceed 24,000 pounds (heavy vehicles), only the former situation needs to be considered, in that such vehicles can be registered only in the months they will be operated.

Data Sources: Information on vehicle use was obtained from the 1987 Truck Inventory and Use Survey conducted by the Bureau of the Census (1990) and from a survey of special (diesel) fuel tax returns that was conducted by the Motor Carrier Services Division of MDT (Ala, 1992). The Truck Inventory and Use Survey (TIUS) is conducted every 5 years and generates an extensive database on trucking operations in each state. In Montana, TIUS contains data on a sample of approximately 2,000 trucks. An overview of the vehicles included in this sample is presented in Table 12. Information available from TIUS includes vehicle body type, weight, principal use, annual miles travelled, and percentage of trips off-the-road, and within local, short, and long range distances of the vehicle's base station. A typical TIUS survey form is presented in Appendix B. Note that in the categories of Logging, Pole, Lowboy, and Concrete, effectively all the vehicles included in the TIUS sample were registered at weights in excess of 24,000 pounds.

Special (diesel) fuel tax returns filed by vehicle operators in Montana also provide information on vehicle use patterns. With the exception of privately operated passenger vehicles, most special fuel users are required to file quarterly fuel tax returns (see Appendix C). These returns include specific information on taxable (on-the-road) and non-taxable (off-the-road) miles travelled. The Motor Carrier Services Division of MDT matched a sampling of these returns with the corresponding gross weight fee classes for the vehicles. A summary of the survey information used in this study is reported in Table 13. Vehicle operators may choose to simply report all miles as taxable, rather than maintain the records necessary to claim off-the-highway miles. Thus, the fuel tax return data may underreport off-the-road use.

Table 12. TIUS Vehicle Data Used in Special Fee Class Analyses.

Vehicle Type	Number of Vehicles	
	Weight less than or equal to 24,000 pounds	Weight greater than 24,000 pounds
Logging	0	86
Pole	0	70
Livestock	56	44
Lowboy	0	70
Concrete	0	11
Farm	132	372
Other	836	474

Table 13. Summary of Special Fuel Use Survey Information Used in this Study.

Fee Class	No. of Operators	Percent of Operators that Claimed Off-the-Road Miles	Total Miles Reported	Off-the-Road Miles Reported
75 Percent	58	72	3,732,712	906,702
55 Percent	43	26	3,614,352	37,492
16 Percent	63	17	1,273,632	61,422

Local Road Use: The relative amount of local highway use engaged in by various types of vehicles was only indirectly addressed in the TIUS data. While TIUS does provide information on the percentage of vehicle trips by the various vehicle types that are considered to be local (see Table 14), the TIUS definition of "local" is based simply on distance travelled (less than 50 miles from base station), rather than the highway system (e.g., primary, secondary, or city and county) that was used. Data of this type may generally indicate relative local road use, assuming that local trips utilize more secondary, city, and county roads than long range trips.

Referring to Table 14, 58 percent of the trips made by full fee paying vehicles with gross weights less than 24,000 pounds were local. A similar percentage of trips were reported to be local by light livestock (56.6 percent) and agricultural (65.9 percent) vehicles. With respect to heavy vehicles, full fee paying vehicles reported 32.8 percent of all trips were local.

Table 14. Analysis of Local Travel.

Gross Maximum Vehicle Weight	Percent of Trips that are Local[+] (less than 50 miles from base station)						
	100 Percent Fee Class	75 Percent Fee Class				55 Percent Fee Class	16 Percent Fee Class
	All Vehicles	Logging	Pole	Livestock	Lowboy	Concrete	Agriculture
Less than or equal to 24,000 lbs	58.4	-	-	56.6	-	-	65.9
Greater than 24,000 lbs	32.8	28.1	36	33.9	33.6	72.3	53.1

[*] Developed from data from Montana respondents, 1987 Truck Inventory and Use Survey, Bureau of the Census (1990)

The categories of Logging, Pole, Livestock, and Lowboy all reported similar percentages of trips to be local (28.1, 36, 33.9, and 33.6 percent, respectively). Heavy concrete and agriculture vehicles did report significantly more local trips than full fee paying vehicles (72.3 and 53.1 percent, respectively).

Off-the-Road Use: Both the TIUS data and the special fuel tax return survey yielded information on the percentage of off-the-road travel engaged in by various types of vehicles. This information is summarized in Table 15. The TIUS data reported in Table 15 is the percentage of trips reported by each type of vehicle as being predominantly off-the-road. The fuel tax data is the percentage of miles reported as non-taxable (on private or forest service roads) by various vehicle operators. Sufficient information is presented in the TIUS data to report on off-the-road travel as a function of gross vehicle weight, while only a single figure for off-the-road travel across all weights was readily available from the special fuel tax data. Note that special or diesel fuel is predominantly used by heavier and high mileage vehicles (as verified by the TIUS data); thus, the special fuel tax data is more indicative of highway use by heavy vehicles (maximum gross weights greater than 24,000 pounds).

Approximately 14 percent of the trips taken by full fee paying vehicles (both light and heavy) were reported to be off-the-road. Twenty-six and 27 percent, respectively of the trips made by light livestock (75 percent fee class) and farm (16 percent fee class) vehicles were off-the-road (approximately twice as much off-the-road use as was reported by light full fee paying vehicles). With respect to heavy vehicles in the 75 percent fee class, TIUS data indicated that Logging and Pole vehicles averaged 19 percent off-the-road travel. Livestock trucks and Lowboys were engaged in fewer off-the-road trips than full fee paying vehicles. Eleven and 12 percent, respectively of the trips taken by these two types of vehicles were reported to be off-the-road. The special fuel use survey indicated that 24 percent of the travel (by miles) of 75 percent fee paying vehicles was off-the-road. This figure is of the same order of magnitude as the TIUS data on Pole trucks. This agreement between the special fuel use and TIUS data generally supports the supposition that the percent of off-the-road travel expressed in terms of trips is at least broadly related to the percent of off-the-road travel expressed in terms of mileage. Information on the specific types of vehicles represented within each fee class was not readily available in the special fuel use survey. Seventy-two percent of the respondents in the sample for the 75 percent fee class did claim off-the-road miles. In the 55 percent fee class, the TIUS data indicated that only 9.5 percent of the trips taken by concrete trucks were off-the-road, and the fuel use survey indicated that only 1 percent of concrete truck mileage was off-the-road (only 26 percent of the respondents in this fee class reported off-the-road miles).

Table 15. Analysis of Off-the-Road Travel.

Gross Maximum Vehicle Weight	Percent of Off-the-Road Travel[+]									
	100 Percent Fee Class	75 Percent Fee Class					55 Percent Fee Class		16 Percent Fee Class	
	TIUS Data[*]	TIUS Data[*]				Special Fuel Survey[#]	TIUS[*]	Special Fuel Survey[#]	TIUS[*]	Special Fuel Survey[#]
	All Vehicles	Logging	Pole	Livestock	Lowboy	All	Concrete	All	Agricultur	All
Less than or equal to 24,000 lbs	14.1	-	-	26.0	-	24.3	-	1.0	27.4	less than 20
Greater than 24,000 lbs	13.8	16.2	21.0	11.0	12.0		9.5		22.8	

[+] For TIUS Data, Percent of Off-the-Road Trips; For Special Fuel Survey, Percent of Off-the-Road Miles

[*] Developed from data from Montana respondents, 1987 Truck Inventory and Use Survey, Bureau of the Census (1990)

[#] Developed from data from in-house survey on Special Fuel User Tax Returns, Motor Carrier Services Division (1992)

Based on the TIUS data, 23 percent of the trips taken by heavy farm vehicles were off-the-road, compared to 13.8 percent for full fee paying vehicles. In the special fuel use survey, vehicles in the farm fee class claimed only 5 percent of their miles travelled as off-the-road. As previously mentioned, off-the-road mileage reported in the fuel tax survey may be misleading, in that operators, for a variety of reasons, may understate their off-the-road miles. Of the 63 operators in the 16 percent fee class considered in this study, only 17 percent claimed any off-the-road miles.

The TIUS based characterization of off-the-road travel was selected for use throughout the remainder of these analyses, as this data was judged to be more complete and certain than the Special Fuel Use Survey data. The primary uncertainty in using the TIUS data is that the available information refers to trips rather than miles travelled.

Seasonal Use: The responsibility of vehicles for highway costs is more closely related to the mileage they travel during the year than the calendar time they are active during the year. Thus, any decrease in cost responsibility due to seasonal operation should generally be based on the underlying decrease in the annual miles travelled by seasonally used vehicles compared to other vehicles. Note, once again, that this information is only of interest for vehicles with registered maximum gross weights of less than or equal to 24,000 pounds, as heavier vehicles are able to register for partial years. Of the various types of special fee class vehicles, only livestock and farm vehicles are practically registered at weights of less than 24,000 pounds. Light livestock and farm vehicles travelled an average of 6,337 and 3,052 miles, respectively, during the year. The average annual miles travelled by all other light vehicles was 7,689. Thus, typical light livestock vehicles travelled 83 percent of the miles travelled by corresponding vehicles that pay 100 percent gross weight fees. A 16 percent fee class farm vehicle travelled 40 percent of the average miles travelled by a full fee paying vehicle.

Equity of Special Gross Weight Fees: The fairness of the 75, 55, and 16 percent special gross weight fees was studied utilizing the highway use data presented above. For light vehicles (registered maximum gross weights of less than 24,000 pounds), sufficient information is available to comment on the special fees paid by livestock and agricultural vehicles. For these two types of vehicles, local road use was similar to that of full fee paying vehicles, and thus is not an issue in evaluating the special fees. The percentage of the full fee these vehicles should pay was calculated based on their on-the-road operation (i.e. 100 percent minus percent of off-the-road operation) and the miles they travel annually relative to full fee paying vehicles:

$$\textit{Fraction of Full Fee} = \frac{\textit{\% on-the-road, special vehicle}}{\textit{\% on-the-road, full fee vehicles}} * \frac{\textit{annual miles, special vehicle}}{\textit{annual miles, full fee vehicles}}$$

The rates calculated in this fashion are summarized in Table 16. For light livestock trucks, the calculated special fee is 71 percent of the full fee, which agrees closely with the 75 percent fee presently charged. The special fee calculated for light farm vehicles is 35 percent of the full fee, which is significantly more than their present fee rate of 16 percent. As noted previously, reported farm fees in other states varied from 25 to 70 percent with a mean value of 50 percent (FHWA, 1988).

Table 16. Equity Based Special Fees for Present 75, 55, and 16 Percent Vehicles.

Vehicle Type	Weight	Existing Fee, as a Percent of Full Fees	Equity Based Fee, as a Percent of Full Fees
Pole Trailers, Logging Vehicles	Less than or equal to 24,000 pounds	75	*
	Greater than 24,000 pounds	75	90
Lowboys	Less than or equal to 24,000 pounds	75	*
	Greater than 24,000 pounds	75	102
Livestock Haulers	Less than or equal to 24,000 pounds	75	71
	Greater than 24,000 pounds	75	103
Ready-Mix Concrete	Less than or equal to 24,000 pounds	55	*
	Greater than 24,000 pounds	55	95
Fertilizer	Less than or equal to 24,000 pounds	55	+
	Greater than 24,000 pounds	55	+
Farm Vehicles	Less than or equal to 24,000 pounds	16	35
	Greater than 24,000 pounds	16	81

* too few vehicles of this type operate at this weight to establish a fee rate from traffic data
+ no data available on fertilizer trucks

The special fees calculated for heavy vehicles (registered maximum gross weight greater than 24,000 pounds) using the data presented above are also summarized in Table 16. The fees for these vehicles, which are allowed partial year registration, were calculated simply based on the calculated amount they operate on-the-road versus comparable full fee paying vehicles:

$$\text{Fraction of Full Fee} = \frac{\%\ \text{on-the-road, special vehicle}}{\%\ \text{on-the-road, full fee vehicles}}$$

This calculation does not address the influence of local road operation on cost responsibility. This issue is relatively unimportant for the 75 percent fee class, as the percentage of local trips made by 75 percent fee vehicles is similar to that of full fee paying vehicles (see Table 14). Concrete trucks and heavy farm vehicles do engage in significantly more local trips than comparable full fee vehicles. With the limited data available, several assumptions had to be made to analyze the influence of this situation on the fee rate. The simple analysis summarized in Table 17 indicates that the state expenditures on secondary road service on a per mile of use basis is approximately 80 percent of the average state expenditures on all the other units in the highway system. Thus, if concrete and farm vehicles travelled exclusively on secondary roads on their local trips, their cost obligation (to the state) would be 80 percent of full fees (ignoring any adjustments due to off-the-road use). Realistically, local trips would probably involve some travel on other units of the highway system, and thus a fee equal to 90 percent of full fees might be justified. The net fee for concrete and heavy farm vehicles would then be the product of the off-the-road and local road factors, namely, 95 and 81 percent, respectively.

Referring to Table 16, the calculated special fees range from 35 to 103 percent of the full gross weight fees. With the exception of light livestock vehicles, the existing special fees are lower than the fees calculated based on the highway use patterns discussed herein.

Special Gross Weight Fees, Busses and House Trailers

The seat based fees presently charged busses in lieu of gross weight fees appear to be equitable, although the rational behind the fee system is unclear. The highway cost responsibility for busses is more closely related to weight and ESAL factor rather than number of seats. Simple analyses indicate, however, that payments based on the existing gross weight fee schedule would be similar in magnitude to those based on seating. A bus with 50 passenger seats, for example, pays $7 dollars per seat for 43 seats, or a net annual cost of $301. Assuming the bus had a registered gross vehicle weight of 34,000 pounds, the annual fee would be $319. The special fee paid by overlength

Table 17. Cost Responsibility, Secondary Versus Primary and Interstate Highway Systems (1990).

Item of Expenditure	Allocator	Total Spent	Expenditure on Secondary System	Expenditures on All Other Systems
Motor Carrier Services Division Operations	Axle Miles Travelled	$ 3,406,492	$ 286,564	$ 3,119,928
General Operations	Vehicle Miles Travelled	7,496,138	657,039	6,839,099
Pre-Construction	Vehicle Miles Travelled	5,055,263	443,096	4,612,167
Construction	Actual	63,098,174	6,120,523	56,977,651
Maintenance	Actual	43,358,455	1,000,930	42,357,525
Bond Interest	Vehicle Miles Travelled	9,966,107	873,533	9,092,574
Dept. of Justice	Vehicle Miles Travelled	10,384,727	910,225	9,474,502
Miscellaneous	Vehicle Miles Travelled	(663,408)	(58,148)	(605,260)
Total	-	142,101,948	10,233,761	131,868,187
Expenditure per Vehicle Mile of Use	-	-	$ 0.0190	$ 0.0236

vehicles ($0.75 per foot of length, in addition to normal gross weight fees) may be related to recovering the cost of administering the overlength permit program.

Revenue Required to Meet Expenditures

Assuming the state highway system is being operated and maintained to the satisfaction of its users, present expenditures provide a reasonable indication of the total revenue necessary to finance the system. The average absolute costs of providing each type of vehicle with highway service are presented in Table 18. These costs were calculated by dividing the average annual expenditures allocated to each vehicle configuration by the corresponding vehicle miles travelled. Future total revenue requirements can be simply estimated by applying inflation factors to these costs.

Table 18. Highway Expenditures by Vehicle Configuration.

Description	Expenditures, $ per vehicle mile of travel
Basic Vehicles	
Pass. Car,	0.018
Light Truck, Vans, RV	0.020
Intermediate Vehicles	
Busses	0.035
2 Axle/4 Tire	0.023
2 Axle/6 Tire	0.040
Heavy Vehicles	
3 Axle, Single Unit	0.053
4+Axle, Single Unit	0.070
3 Axle Semi	0.049
4 Axle Semi	0.055
5 Axle Semi	0.065
6 Axle Semi	0.105
3 Axle Trk, Full Tr	0.034
4 Axle Trk, Full Tr	0.033
5 Axle Trk, Full Tr	0.105
6 Axle Trk, Full Tr	0.095
5 Axle Semi, Full Tr	0.055
6 Axle Semi, Full Tr	0.069
7 Axle Semi, Full Tr	0.083
8 Axle Semi, Full Tr	0.080
7+Axle, Triple Tr	0.046
Simple Average	0.057

Consistent with the manner in which expenditures were allocated, the unit costs presented in Table 18 are composed primarily of two components,

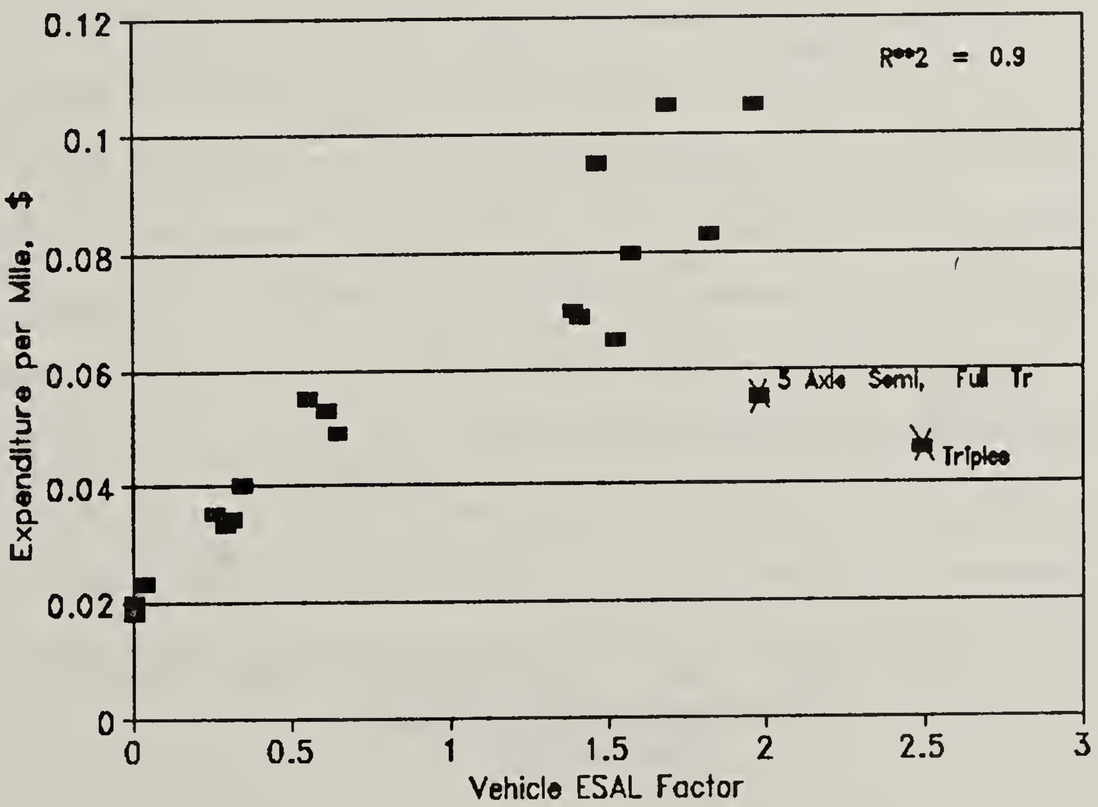
(1) a common cost component generated by expenditures allocated based on vehicle miles travelled, and

(2) a variable cost component generated by expenditures allocated based on ESALs.

To the extent that the variable costs are predominant, a relationship should exist between the unit cost (or revenue required) from each vehicle configuration and the average operating ESAL factor.

Unit costs are plotted as a function of vehicle ESAL factor in Figure 1. As expected, costs generally increase in a regular manner as ESAL factor increases. Deviation of specific data points from a pure linear relationship are believed to reflect differences in the specific highways predominantly used by each type of vehicle and the associated differences in state spending on these highways. The federal government generally assumes more responsibility for construction expenditures on the interstate system compared with other units of the federal aid system. Thus Montana's expenditures on this system may be lower per vehicle mile travelled than on other units. Expenditures on 5 Axle Semi with full trailer and 7+ axle triples, for example, are notably lower than might be expected based on the general ESAL to expenditure relationship. A review of the traffic data indicated that these two types of vehicles operate extensively on the interstate highway system (over 77 percent of VMT for 5 axle semi with full trailer, and almost 100 percent of VMT for 7+ axle triples). In general, vehicles with similar ESAL factors but lower unit expenditures were found to engage in more travel on the interstate system. Note that excluding 5 axle semi with full trailer and 7+axle triples from consideration, units costs and ESAL factors are highly correlated (correlation factor of 0.9).

Figure 1. Expenditure per Vehicle Mile as a Function of Average Operating ESAL factor.



User fees generally involve some aspect of vehicle weight rather than average operating ESALs. Unit costs are plotted as a function of maximum registered gross vehicle weight in Figure 2. The relationship between cost and maximum gross weight is less well defined than the relationship between cost and ESAL factor. This situation is to be expected, as ESAL factors are related to both the weight carried and the axle configuration employed.

A comparison of highway expenditures per mile of travel in Montana with those of other states is presented in Table 19. While Montana expenditures are generally consistent with those in other states, the relative level of highway service being provided at that cost in those states is not specifically known.

Note that in the future, expenditures on the highway system are expected to increase (independent of any increase in expenditures in response to the additional federal funding available to ISTEA). Over the next four years (1992 to 1995), annual expenditures are predicted to average approximately $150,000,000 compared to $142,000,000 over the past 4 years (MDT, 1991a).

Figure 2. Expenditure per Vehicle Mile as a Function of Typical Maximum Gross Vehicle Weight.

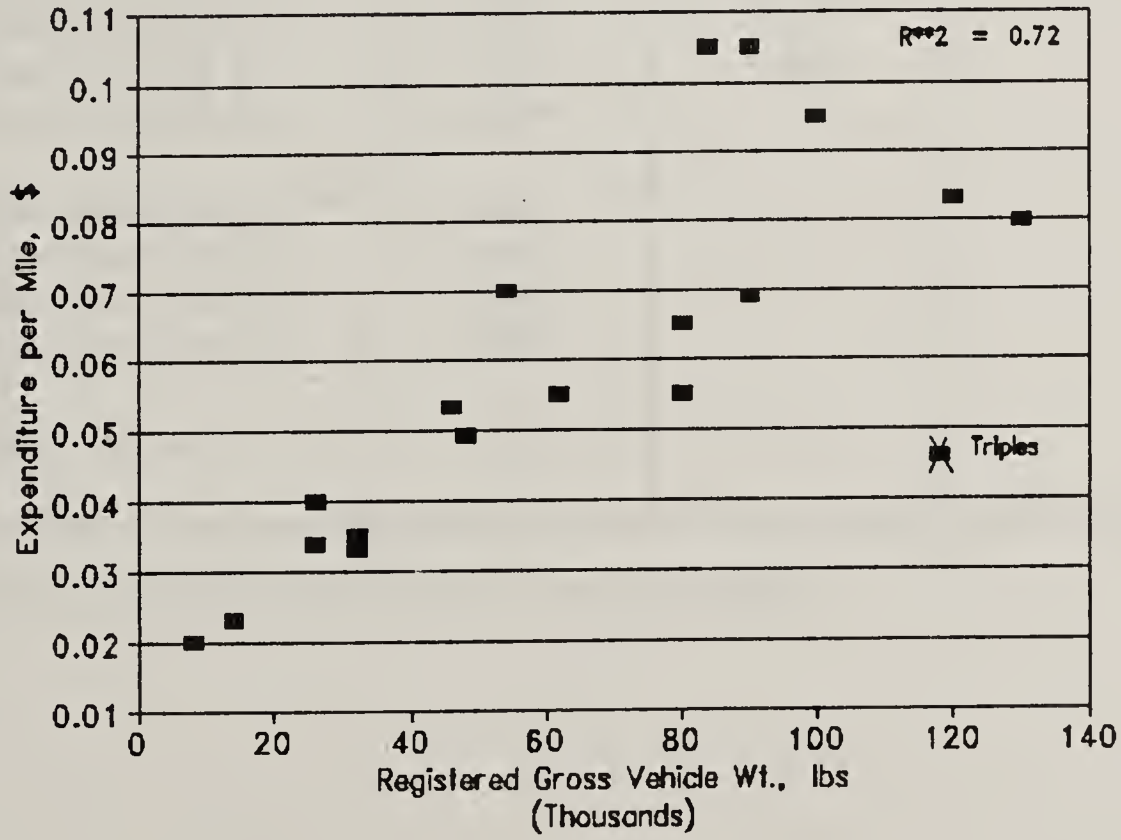


Table 19. Highway Expenditures by Vehicle Configuration in Other States.

Description	Expenditures, $ per vehicle mile of travel		
	Montana	Vermont (Sydec, 1990)	Wyoming* (Wilbur Smith and Associates, 1981)
Basic Vehicles			
Pass. Car,	0.018	0.015	0.026-0.031
Light Truck, Vans, RV	0.020	0.016	0.026-0.046
Intermediate Vehicles			
Busses	0.035	0.031	
2 Axle/4 Tire	0.023		0.039-0.043
2 Axle/6 Tire	0.040		0.062-0.105
Heavy Vehicles			
3 Axle, Single Unit	0.053	0.074	0.077-0.118
4+Axle, Single Unit	0.070		
3 Axle Semi	0.049	0.050	
4 Axle Semi	0.055	0.058	
5 Axle Semi	0.065	0.065	
6 Axle Semi	0.105		
3 Axle Trk, Full Tr	0.034	0.050	
4 Axle Trk, Full Tr	0.033	0.058	
5 Axle Trk, Full Tr	0.105	0.065	
6 Axle Trk, Full Tr	0.095		
5 Axle Semi, Full Tr	0.055		
6 Axle Semi, Full Tr	0.069		
7 Axle Semi, Full Tr	0.083		
8 Axle Semi, Full Tr	0.080		
7+Axle, Triple Tr	0.046		

* Wyoming considered several cost allocation schemes

RECOMMENDED CHANGES IN THE REVENUE STRUCTURE

General Remarks

The present structure for financing the state highway system is fairly equitable in charging basic, intermediate, and heavy vehicles for their use of the system; the total revenue collected, however, is inadequate to meet expenditures. One solution to this problem is to uniformly increase user taxes, and thus increase total revenues without disturbing the equity situation. A better approach is to specifically increase user fees for those vehicles presently underpaying their cost responsibility (in this case, basic vehicles). Such an approach was taken in the original cost allocation study, in which raising the new vehicle sales tax 400 percent or fuel taxes 22.5 percent was considered to both address equity problems (between the broad classes of basic, intermediate, and heavy vehicles) and increase total revenues. The equity analysis conducted in this study at the vehicle configuration level indicated that while no vehicles are dramatically underpaying their cost responsibility (the minimum equity ratio was 0.70 for a five axle truck and trailer), some vehicles are significantly overpaying their responsibility (the maximum equity ratio was 3.46 for 7+ axle triple trailers). While all these ratios reflect some measure of uncertainty, it will be difficult to eliminate these inequities using a simple tax system generally applicable to all vehicles. A simple tax system, however, is desirable from an administrative perspective.

In attempting to address inequities at the vehicle configuration level, it is important to note that many assumptions were involved in analyzing and assigning revenues at this level. Due to the associated uncertainties in the results, it is appropriate to utilize these results in a general rather than vehicle specific fashion. Note that the expenditures assigned to each vehicle configuration were judged to be more certain than the revenues allocated to each vehicle configuration. With respect to equity with-in a vehicle configuration, many of the special fees offered to particular types of vehicles in the present gross weight fee schedule were found to be unjustified. These special fees should be modified to more closely reflect the manner in which vehicles are actually using the highway system.

While adequate revenue to fund the highway system can be generated by simply altering existing user fees and still maintain a generally equitable system, one objective of this study was to investigate alternate methods of collecting user fees that are possibly more efficient, equitable, or more compatible with practices in other states compared to present methods. The gross weight fee system was of particular interest in this regard. One change to this system, justifiable based on equitability, efficiency, and compatibility with other states, is to place the assessment of such fees

primarily on the power unit of combination configurations. This change should be implemented in the near future to avoid jeopardizing Montana participation in the IRP. There is a growing movement among the membership of IRP to make power unit based fee systems mandatory in all participating jurisdictions (Galt, 1992). Furthermore, participation in the IRP is required under ISTEA if Montana is to continue collecting road user fees from non-resident trucks beyond 1995 (Galt, 1992).

To fundamentally improve the equitability of the finance system, basic changes are necessary in the system, and, over the next several years, careful consideration should be given to making such changes. Changes recommended herein include elimination of the new vehicle sales tax, imposition of an annual registration fee for passenger cars, and revision of the gross weight fee system.

Rate Changes, Existing System

A simple approach to generating increased revenue for the highway system is to increase tax rates within the framework of the existing revenue structure. By selectively proceeding in this fashion, it also is possible to at least partially address inequities in the system. Two ideas consistent with this approach were advanced in the original cost allocation study,

(1) raise the new vehicle sales by 400 percent.

(2) raise the gasoline fuel tax (but not the special fuel tax) by 22.5 percent. Eighteen states have different gasoline and special fuel tax rates; one-third of these states place a higher tax on gasoline than on diesel fuel (see Table 2).

A third approach to increasing revenue and simultaneously improving equity was explored in which gasoline and special fuel taxes were raised by the same amount while gross weight fees were lowered. The effects of these various adjustments to the revenue system were evaluated using the framework of the cost allocation study. The revenue and equity analyses were conducted presuming that alteration of the tax rates would not influence vehicle and fuel purchase patterns.

Increasing the new vehicle sales tax by 400 percent or the gasoline tax by 22.5 percent would have resulted in the generation of approximately $18,500,000 in additional annual average revenue over the 4 year study period. This sum is sufficient to replace the average annual supplemental revenue withdrawn from the working cash balance (to cover the deficit), the interest income collected on that balance, and the revenue from the ACI reimbursement (total of $15,825,969). Effectively, annual revenue derived from permanent sustainable sources would have met (and nominally exceeded) annual expenditures.

The increase in the new vehicle sales tax resulted in equity ratios of 1.00, 1.02, 0.98 for basic, intermediate, and heavy vehicles, respectively. Increasing the gasoline sales tax resulted in equity

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

ratios of 0.99, 1.14, and 0.98 for basic, intermediate, and heavy vehicles, respectively. This tax increase notably improved the equity ratios for basic and heavy vehicles. Basic vehicles, which were found to be relatively underpaying their cost responsibility, operate almost exclusively using gasoline. Conversely, heavy vehicles, which were found to be relatively overpaying their cost responsibility, realize no additional liability from a gasoline tax increase, as they operate almost exclusively using special (diesel) fuel. Referring to Table 20, the equity situation at the vehicle configuration level was only nominally changed by either of these tax adjustments.

Table 20. Influence of Changes in the Gasoline and New Vehicle Sales Taxes on Equity and Revenue Collected.

Vehicle Description	Existing Equity Ratios	New Equity Ratios	
		22.5 Percent Increase, Gasoline Tax	400 Percent Increase, New Vehicle Sales Tax
Basic Vehicles			
Pass. Car,	0.87	0.89	0.93
Light Truck, Vans, RV	1.10	1.13	1.10
Intermediate Vehicles			
Busses	1.52	1.51	1.38
2 Axle/4 Tire	1.14	1.14	1.07
2 Axle/6 Tire	1.05	1.07	0.96
Heavy Vehicles			
3 Axle, Single Unit	0.96	0.92	0.91
4+Axle, Single Unit	1.36	1.27	1.36
3 Axle Semi	1.25	1.17	1.26
4 Axle Semi	1.69	1.56	1.66
5 Axle Semi	1.13	1.03	1.02
6 Axle Semi	0.82	0.75	0.75
3 Axle Trk, Full Tr	2.29	2.13	2.30
4 Axle Trk, Full Tr	1.80	1.67	2.05
5 Axle Trk, Full Tr	0.70	0.63	0.65
6 Axle Trk, Full Tr	0.89	0.81	0.81
5 Axle Semi, Full Tr	1.44	1.31	1.30
6 Axle Semi, Full Tr	1.09	0.99	0.96
7 Axle Semi, Full Tr	0.80	0.73	0.71
8 Axle Semi, Full Tr	0.89	0.81	0.79
7+ Axle, Triple Tr	3.46	3.14	3.06
Estimated Absolute Increase in Annual Revenue	-	$18,500,000	$18,500,000

Another approach investigated to generate additional revenue and improve the equity of the highway finance system involved increasing gasoline and special fuel taxes by the same amount while lowering gross weight fees. Presently, intermediate and heavy vehicles are relatively overpaying their cost responsibility compared to basic vehicles. Increasing taxes on special fuels will exacerbate this situation, as some intermediate vehicles and almost all heavy vehicles operate using special (diesel) fuels. This effect can be mitigated by simultaneously decreasing the gross weight fees charged intermediate and heavy vehicles. The effect on user equity of a variety of fuel tax increases coupled with gross weight fee reductions were considered. Increasing all fuel taxes by 22.5 percent, for example, resulted in equity ratios of 0.96, 1.13, and 1.06, for basic, intermediate, and heavy vehicles, respectively. Equity was improved by subsequently eliminating gross weight fees from basic and intermediate vehicles and reducing gross weight fees paid by heavy vehicles by 40 percent. These steps resulted in equity ratios of 0.99, 1.07, and 1.00 for basic, intermediate, and heavy vehicles, respectively.

Increasing the gross weight charges paid by special fee vehicles to the equitable levels already discussed also increased highway revenues. The special gross weight fees paid by pole trailers, lowboys, and livestock haulers (75 percent); haulers of ready-mix concrete and fertilizer (55 percent); and many farm vehicles (16 percent) need to be revised. It was previously shown that with the exception of light livestock vehicles (maximum gross weights less than or equal to 24,000 pounds), these vehicles are underpaying their cost responsibility relative to full fee paying vehicles. Proposed special fee rates for these vehicles are listed in Table 21. Data on vehicle use patterns support setting fees for livestock and farm vehicles with maximum gross weights of less than 24,000 pounds at 70 and 35 percent, respectively, of full fees. For heavy vehicles (maximum gross weight greater than or equal to 24,000 pounds), the analyses performed herein indicate the minimum fee for Logging and Pole vehicles (presently in the 75 percent fee class) is 90 percent of full fees. Livestock trucks and Lowboys (also currently in the 75 percent fee class) should pay full fees. Concrete and heavy farm vehicles should pay 95 and 80 percent of full fees, respectively. Few pole trailers/logging trucks, lowboys, and concrete trucks were found to operate at weights less than 24,000 pounds, and recommended fee rates for any such vehicles were simply set at the rate determined for heavier vehicles. Minimal information was located on road use characteristics of fertilizer trucks. It may be reasonable, however, to charge fees on fertilizer trucks under farm vehicle rates. Note that while these various changes will improve equity between vehicles within a configuration, equity between the broad classes of basic, intermediate, and heavy vehicles will nominally be further distorted.

Table 21. Proposed Special Fees for Present 75, 55, and 16 Percent Vehicles.

Vehicle Type	Weight	Existing Fee, as a Percent of Full Fees	Equity Based Fee, as a Percent of Full Fees
Pole Trailers, Logging Vehicles	Less than or equal to 24,000 pounds	75	90*
	Greater than 24,000 pounds	75	90
Lowboys	Less than or equal to 24,000 pounds	75	100*
	Greater than 24,000 pounds	75	100
Livestock Haulers	Less than or equal to 24,000 pounds	75	70
	Greater than 24,000 pounds	75	100
Ready-Mix Concrete	Less than or equal to 24,000 pounds	55	95*
	Greater than 24,000 pounds	55	95
Fertilizer	Less than or equal to 24,000 pounds	55	35+
	Greater than 24,000 pounds	55	80+
Farm Vehicles	Less than or equal to 24,000 pounds	16	35
	Greater than 24,000 pounds	16	80

* presently, few vehicles of this type operate at this weight

+ no information was found on road use by fertilizer trucks, these fees were simply assigned equivalent to those of farm vehicles

Following this recommendation, additional revenue will be collected from intermediate and heavy vehicles, which are already overpaying their cost responsibility with respect to basic vehicles.

Changing the special gross weight fee rates as recommended above resulted in approximately a 10 percent increase in gross weight revenue over the four year study period (corresponding to an average annual increase of $1,425,333). This estimate is based on intrastate gross weight fee data from the Motor Carrier Services Division of MDT (Ala, 1992). This estimate is uncertain, in that

as the special fee rates are raised, vehicle registration patterns may change. Notably, operators that presently register special fee vehicles for the entire year may opt for part year registration, if gross vehicle fees are raised.

The effect of increasing the special fee rates was estimated using the available intrastate gross weight fee data. For vehicles with gross weights under 26,000 pounds, the available information consisted of the number of vehicles registered by weight in 2,000 pound increments from 6,000 to 24,000 pounds. Based on the TIUS data, it was assumed that the only special fee vehicles of interest in this weight range were farm vehicles. The impact of changing the fee rate to 35 percent was evaluated by assuming 67 percent of the vehicles registered as farm vehicles. This percentage was obtained from the 26,000 pound weight group, for which the percentage of farm fee vehicles was known.

At gross vehicle weights greater than 24,000 pounds, revenue information was available by both weight and fee class. Registration information for special fee classes indicated that 75 and 55 percent vehicles register only for part of the year. Thus, for 75 and 55 percent vehicles, projected gross weight revenue under the new rates was calculated as the product of present revenue multiplied by the ratio of the new fee rate to the old fee rate. Registration information for 16 percent vehicles indicated that almost all farm vehicles register for a full year. The increase from 16 to 35 percent in the special fee for farm vehicles may result in many of these vehicles being registered for only certain months during the year. For farm vehicles in this weight class, projected revenue under the new fee rate was calculated by multiplying present revenue by the ratio of recommended fee rate to the existing fee rate and dividing by two (assuming many vehicles shift to a six month registration period).

Power Unit Based Gross Weight Fee System

A power unit based gross weight fee system should be adopted in Montana. This approach to assessing gross weight fees for combinations is reasonable, in that trailers can only operate on the highway in combination with a power unit. Under the present system, a vehicle operator with more trailers than power units may pay gross weight fees on trailers that are idle part of the time. Assessing the primary gross weight fee on the power unit of combination vehicles is practiced in the majority of states, as previously mentioned. Following this system, a single fee schedule can be utilized for all vehicle configurations (single units and combinations). The fee is generally based on a registered maximum gross weight of the complete vehicle, independent of the specific trailer(s) to be used. The weight related power unit fee is often supplemented by a nominal fixed fee for each trailer. This fee typically is less then $50.00, and some states offer multi-year and/or permanent

registration options (FHWA, 1988). The impact of changing to a power unit based fee schedule on vehicle operators can be minimized by initially using a fee schedule designed to generate fees similar to those paid under the existing gross weight fee system.

The proposed power unit based fee schedule for Montana is presented in Table 22. This schedule was developed to generally produce annual gross weight fees equivalent to those paid by vehicles under existing Schedules I and II (see Table 4). Schedule I and II fees were calculated for each vehicle configuration based on a gross weight at or close to the maximum allowable by law. Annual fees for single units were simply taken directly from Schedule I. For combination units, specific weights were assigned to each unit of the combination. The annual fees that would be assessed on each unit were summed to obtain the net fee for the combination. The gross weights assigned to each unit of the combination were summed to obtain the total gross weight of the combination. The fees obtained by this process are plotted as a function of total gross vehicle weight in Figure 3, and they are listed in Table 23. Note that the fees charged under Schedule III of the existing fee schedule are also shown in Figure 3. Schedule III is a power unit based fee system; the fees charged under schedule III, however, are significantly higher than those charged under Schedules I and II for equivalent vehicles. The reason for this disparity in the fees charged under the two registration schemes is unclear.

The proposed power unit based fee schedule was developed by fitting a sequence of straight lines through the Schedule I and II data points presented in Figure 3. The first segments of the fee schedule, covering gross weights up to 22,000 pounds, exactly duplicate the existing fee structure under Schedule I. The next segment of the fee structure, beginning at 22,001 pounds and effectively extending to 70,000 pounds, was established by fitting a least squares line through the points in this interval. The present fee system generates significantly different charges for single and combination units of the same weight. This situation is of some concern in the region from 40,000 to 60,000 pounds which includes heavy single units and light combinations. The decision was finally made to simply fit the schedule through the points shown in Figure 3. While this approach admittedly lowers fees charged to 3 axle single units, which were found to be nominally underpaying their cost responsibility (see Table 6), it also reduces the fees charged to 4+ axle single units, which were found to be overpaying their relative cost responsibility. Fees charged 3 and 4 axle semis, which were found to be overpaying their cost responsibility, will increase. The power unit schedule was completed by fitting a final line segment through the points corresponding to weights greater than 70,000 pounds (the special fee calculated for 7+ axles triples, was not included in the fit).

A comparison of the fees charged under the existing schedule and those that will be charged under the new schedule for each vehicle configuration are listed in Table 23. The greatest fee

[illegible]

[illegible]

[illegible]

[illegible]

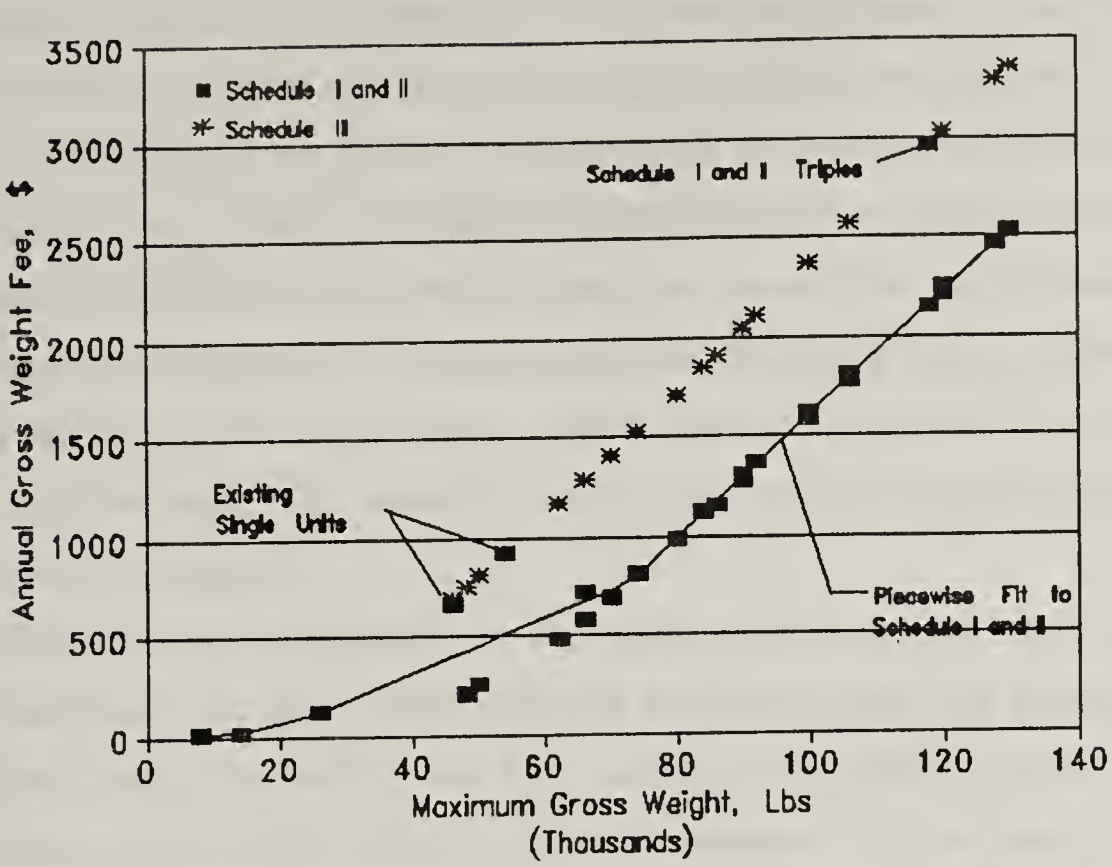
Table 22. Proposed Power Unit Based Gross Weight Fee Schedule.

Weight	Fee
Up to 6,000 lbs	$ 7.50
6,001 through 8,000	12.50
8,001 through 10,000	17.50
10,001 through 12,000	20.00
12,001 through 14,000	22.50
14,001 through 16,000	27.50
16,001 through 18,000	42.00
18,001 through 20,000	56.50
20,001 through 22,000	62.50
22,001 through 24,000	90.00
24,001 through 26,000	117.50
26,001 through 28,000	145.00
28,001 through 30,000	172.50
30,001 through 32,000	200.00
32,001 through 34,000	227.50
34,001 through 36,000	255.00
36,001 through 38,000	282.50
38,001 through 40,000	310.00
40,001 through 42,000	337.50
42,001 through 44,000	365.00
44,001 through 46,000	392.50
46,001 through 48,000	420.00
48,001 through 50,000	447.50
50,001 through 52,000	475.25
52,001 through 54,000	503.00
54,001 through 56,000	530.75
56,001 through 58,000	558.50
58,001 through 60,000	586.25
60,001 through 62,000	614.00
62,001 through 64,000	641.75
64,001 through 66,000	669.50
66,001 through 68,000	697.25
68,001 through 70,000	725.00
70,001 through 72,000	755.00
72,001 through 74,000	809.75
74,001 through 76,000	871.25
76,001 through 78,000	932.75
78,001 through 80,000	994.25
Per ton or part ton in excess of 80,000 lbs	994.25 + 61.50 per ton

Table 23. Analysis of Proposed Power Unit Based Fee Schedule.

Vehicle Description	Code	Maximum Gross Weight	Gross Weight Fee		Projected Revenue		
			Existing Schedule I and II	Equivalent Power Unit Based Schedule	Under Current Schedules	Under New Power Unit Schedule	Percent Change
Basic Vehicles							
Pass. Car,	-	6,000	-	-	-	-	-
Light Truck, Vans, RV	-	8,000	12.50	12.50	2,650,000	2,650,000	0
Intermediate Vehicles							
Busses	-	(32000)	-	-	-	-	-
2 Axle/4 Tire	2A/4T	14,000	22.50	22.50	493,088	493,088	0
2 Axle/6 Tire	2A/6T	26,000	125.00	117.50	2,037,625	1,915,368	-6
Heavy Vehicles							
3 Axle, Single Unit	3A	46,000	668.75	392.50	3,041,475	1,785,090	-41
4+Axle, Single Unit	4A+	54,000	918.75	503.00	106,575	58,348	-45
3 Axle Semi	2S1	48,000	206.25	420.00	46,819	95,340	104
4 Axle Semi	2S2	62,000	475.00	614.00	249,375	322,350	29
	3S1	66,000	581.25	669.50			
5 Axle Semi	3S2	80,000	987.50	994.25	4,969,100	5,003,066	1
	2S3	74,000	812.50	809.75			
6 Axle Semi	3S3	90,000	1275.00	1301.75	450,075	459,518	2
3 Axle Trk, Full Tr	2-1	50,000	256.25	447.50	13,581	23,718	75
4 Axle Trk, Full Tr	2-2	70,000	693.75	725.00	135,281	141,375	5
	3-1	66,000	718.75	669.50			
5 Axle Trk, Full Tr	2-3	84,000	1125.00	1117.25	148,500	147,477	-1
	3-2	86,000	1156.25	1178.75			
6 Axle Trk, Full Tr	3-3	100,000	1587.50	1609.25	263,525	267,135	1
5 Axle Semi, Full Tr	2S1-2	80,000	1012.50	994.25	111,375	109,368	-2
6 Axle Semi, Full Tr	2S1-3	90,000	1312.50	1301.75	77,438	76,803	-1
	2S2-2	106,000	1812.50	1793.75			
7 Axle Semi, Full Tr	3S1-2	106,000	1775.00	1793.75			
	2S1-4	120,000	2250.00	2224.25			
	2S2-3	120,000	2250.00	2224.25			
	3S1-3	120,000	2212.50	2224.25			
	3S2-2	120,000	2212.50	2224.25	878,363	880,625	1
8+ Axle Semi, Full Tr	2S2-4	100,000	1625.00	1609.25			
	2S3-3	100,000	1625.00	1609.25			
	3S1-4	128,000	2462.50	2470.75			
	3S2-3	130,000	2525.00	2532.25	901,425	883,027	0
	3S3-3	118,000	2150.00	2162.75			
7+ Axle, Triple Tr		118,000	2963.00	2162.75	80,001	58,394	-27
Total	-	-	-	-	16,652,234	15,393,477	-8

Figure 3. Gross Weight Fees as a Function of Registered Gross Vehicle Weight.



reductions occur for 3 axle and 4+ axle single units, which will pay 41 and 45 percent lower fees, respectively, under the new schedule compared to under Schedules I and II. The greatest fee increases occur for the configurations of 3 axle semi and 3 axle truck full trailer, which will pay fees equal to 204 and 179 percent, respectively, of their fees under the old schedule. Seven plus axle triples will pay 27 percent lower fees under the new schedule compared to their present fees. Of the 31 fees calculated under the new schedule, 22 fees are within 5 percent of the fees obtained using Schedules I and II.

The projected total revenue that will be collected under the new fee schedule is only 92 percent of that collected under existing schedules. This projection was determined by multiplying the fees presented in Table 23 by the equivalent number of full mileage vehicles of each type operating every year. The number of full mileage vehicles was calculated by dividing the total annual miles travelled for each vehicle configuration by an average annual mileage for that type of vehicle. The revenue values calculated in this fashion are presented in Table 23. The decrease in revenue primarily resulted from the decrease in fees charged 3 axle single units. Note that the total loss of revenue, $1,118,186 when calculated as a straight percentage of average annual gross weight fees collected, may be offset by the additional revenue collected if the special gross weight fee rates are increased as recommended herein (estimated increase in revenue of $1,425,333).

Changes to the Basic Structure of the Highway Finance System

Ideally, the highway system should be financed so that the revenue associated with each vehicle configuration matches the expenditures on providing highway service for that vehicle configuration. Naturally, this ideal may have to be compromised to obtain a system that is practical to administer. Presuming users are generally satisfied with the present system, the expenditures by vehicle configuration listed in Table 18 provide a possible target for revenues to match. Furthermore, adopting a conservative posture, this revenue should be derived from secure, sustainable sources. Sources of this type were considered to be direct user fees. Following these premises, a new finance structure for the highway system was devised. Before implementing this (or any other) system, a detailed study should be made with regard to revenue that will be collected, administrative costs, evasion issues, and user reaction.

The new finance structure proposed for the highway system is described in Table 24. Sources of highway revenue under the new system consist of registration fees, fuel taxes, and gross weight fees. Note that with respect to existing user fees, passenger car registration fees are introduced in the new fee structure and the new vehicle sales tax is eliminated. In the interest of simplicity, the decision was made to set the fuel tax in such a manner that a large number of vehicle configurations met their highway cost responsibility simply by paying this tax. Initially, the tax was established so that passenger cars met their entire cost responsibility through fuel taxes. Due to the high fuel economy of passenger cars relative to other vehicles, however, such a tax rate resulted in over payment of cost responsibility by several vehicle configurations. This problem was resolved by establishing the fuel tax so that pickups, vans and recreational vehicles (the second largest configuration based on vehicle miles travelled) meet their entire highway cost responsibility through fuel taxes. The resulting fuel tax (adjusted to account for the $14,146,250 in fuel tax revenue transferred to local governments among other things) is $0.282 per gallon. For passenger cars, this fuel tax translates to an effective tax rate per mile travelled of $0.0136, which is $0.0043 less than their total cost responsibility of $0.0179 per mile travelled. This difference will be paid through a fixed annual registration fee. Assuming passenger cars average 9500 miles of travel per year, and that 90 percent of this mileage is on state highways (an assumption requiring further investigation), this tax would be a flat fee of approximately $40.00.

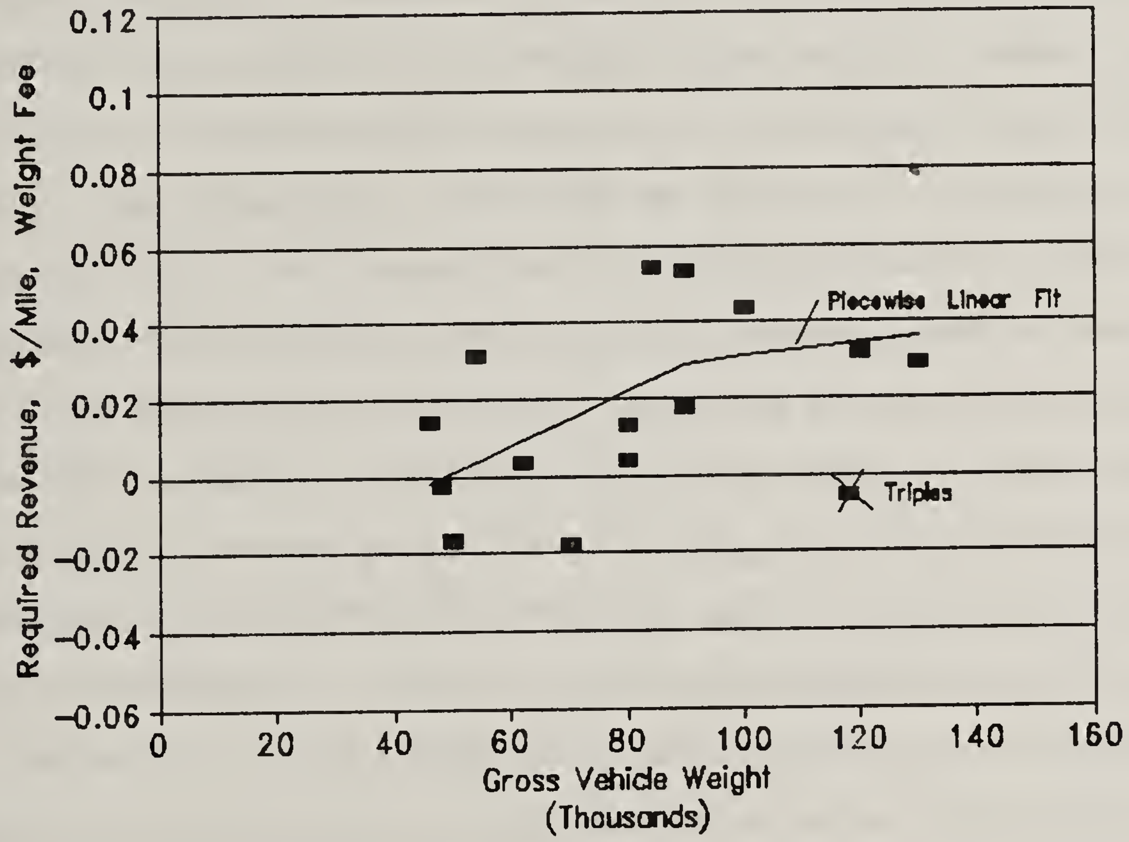
Similar to pickups, intermediate vehicles will meet their highway cost responsibility through fuel taxes. For these vehicles (single units weighing less than 26,000 pounds), fuel consumption per mile driven apparently increases approximately in proportion to highway cost responsibility. The estimated effective fuel tax contributions for each vehicle are listed in Table 24 (assuming a fuel tax rate of $0.282 per gallon).

Table 24. Revised Finance System.

Vehicle Description	Revenue ($ per mile)				Expenditures ($ per mile)	Ratio, Revenue to Expenditures
	Registration	Fuel Tax ($0.282/gallon)	Weight Fee	Total		
Basic Vehicles						
Motorcycle	-	0.006	-	0.006	-	-
Pass. Car	0.004	0.014	-	0.018	0.018	1.00
Light Truck, Vans, RV	-	0.020	-	0.020	0.020	1.00
Intermediate Vehicles						
Busses	-	0.044	-	0.044	0.035	1.26
2 Axle/4 Tire	-	0.020	-	0.020	0.023	0.87
2 Axle/6 Tire	-	0.039	-	0.039	0.040	0.98
Heavy Vehicles						
3 Axle, Single Unit	-	0.051	-	0.051	0.053	0.96
4+Axle, Single Unit	-	0.051	0.004	0.055	0.070	0.79
3 Axle Semi	-	0.051	-	0.051	0.049	1.04
4 Axle Semi	-	0.051	0.010	0.061	0.055	1.11
5 Axle Semi	-	0.051	0.022	0.073	0.065	1.12
6 Axle Semi	-	0.051	0.029	0.080	0.105	0.76
3 Axle Trk, Full Tr	-	0.051	-	0.051	0.034	1.50
4 Axle Trk, Full Tr	-	0.051	-	0.051	0.033	1.55
5 Axle Trk, Full Tr	-	0.051	0.025	0.076	0.105	0.72
6 Axle Trk, Full Tr	-	0.051	0.032	0.083	0.095	0.87
5 Axle Semi, Full Tr	-	0.051	0.022	0.073	0.055	1.33
6 Axle Semi, Full Tr	-	0.051	0.029	0.080	0.069	1.16
7 Axle Semi, Full Tr	-	0.051	0.035	0.086	0.083	1.04
8 Axle Semi, Full Tr	-	0.051	0.036	0.087	0.080	1.09
7+Axle, Triple Tr	-	0.051	0.034	0.085	0.046	1.85

Under the new finance system, heavy vehicles meet their highway cost responsibility through fuel taxes ($0.282 per gallon) supplemented as required by a power unit based gross weight fee. Vehicles with registered gross weights less than 48,000 pounds will meet their cost responsibility using the $0.282 per gallon fuel tax. Between the weights of 48,001 and 90,000 pounds, the fuel tax will be supplemented with a tax of $0.0014 per ton (in excess of 48,000 pounds) per mile of travel. At weights exceeding 90,000 pounds, the tax will be $0.0300 per mile of travel plus $0.0003 per ton (in excess of 90,000 pounds) per mile of travel. These mileage charges were determined by fitting linear relationships through the paired cost responsibility and registered gross vehicle weight data points shown in Figure 4.

Figure 4. Weight and Distance Charge as a Function of Registered Gross Vehicle Weight.



The gross weight tax will be collected annually based on the registered maximum gross weight of a vehicle. The amount of the annual tax can either be fixed for all vehicles of a given registered weight or vary between vehicles based on their specific miles travelled. Following the former approach, a fixed annual fee is calculated for each weight class based on an estimate of the average annual miles travelled by all vehicles of that weight, effectively creating a weight based fee schedule. Alternatively, following the latter approach, the fee would be calculated as a weight distance tax on a vehicle-by-vehicle basis.

The relative merits of these two approaches to levying gross weight fees are being actively debated among the state agencies responsible for their collection and between these agencies and the trucking industry. As previously noted, 40 states reportedly utilized a weight only based fee system as of 1989 (Maine DOT, 1989), and of the 10 remaining states, at least 5 have repealed their weight and distance based systems since that time. The primary argument for a weight and distance approach to fee assessment is that it is theoretically more equitable than a weight only based system. Arguments against the weight and distance fee system include that it is difficult, and thus costly, to administer and enforce with any degree of universality. The same total net revenue is required under either scheme to meet the highway cost responsibility of these vehicles. If collection costs are higher under an explicit weight and distance system than under a weight only system, this cost will probably be passed on to vehicle operators as an increase in fees (and possibly to the public as an increase in shipping costs).

With regard to equity, it is important to recognize that the equity situation between vehicle configurations will be similar under either the weight only or weight and distance based fee systems outlined above. The fee in both instances is based on the gross weight of the vehicle, which is only generally related to cost responsibility. Following the approach used herein for cost allocation, highway cost responsibility is most closely related to the ESAL factor for a vehicle (see Figure 2). Thus, the appropriate theoretical mechanism to tax heavy vehicles would be based on ESALs and miles travelled, rather that gross vehicle weight. Such a tax, however, is presently impractical to administer. The ESAL factor for a vehicle is a function of the axle configuration being used and the specific weight carried on each axle group. A truck carrying the same total load on two consecutive trips, for example, might have different ESAL values for each trip, depending on the specific manner in which the load was distributed on each trip. Thus, rigorous implementation of an ESAL mile tax would require information on axle configuration, axle group loads, and mileage for each trip. Presently, collection and verification of such data would be an onerous task for both vehicle operators and state agencies. Fee systems based on gross vehicle weight are inherently more practical to administer than those based on vehicle ESAL factors, since the variables of axle configuration and load distribution are eliminated from consideration. The resulting fee structures, however, are generally accepted as being less equitable than theoretically possible.

The equity improvement theoretically offered by a weight and distance based fee system over a weight only based system is that similar vehicles that travel different amounts will more closely meet their individual cost responsibilities under the weight and distance system. Following a weight only based system, vehicles that travel different amounts pay the same gross weight fees; high mileage interstate operators, for example, may systematically pay less per mile of travel than low mileage intrastate operators. On the other hand, interstate operators may predominantly travel on systems

that involve lower state expenditures per mile of service provided (e.g., the interstate system) compared to the systems used by intrastate operators. Further study of this situation is warranted, to determine if this type of problem is significant, and if it would indeed be equitably resolved through a weight and distance tax. The equity improvement offered by a weight and distance based tax will only be realized if operators comply with it. Largely voluntary compliance is viewed as essential for the tax to be cost-effective, and evasion may be widespread.

Weight and distance based gross weight fee systems are more expensive for state agencies to administer and vehicle operators to comply with than weight only based fee systems. Following a weight and distance based system, records of vehicle miles travelled must be reported by operators for every vehicle. Collection of information required to validate such reports is costly to both the state and to vehicle operators. Note that some of this information may be readily available through fuel tax reports already required from most vehicle operators and the attendant audit activities related to fuel tax collection. The costs associated with administering a weight and distance based fee system may decrease in the future, as new technologies are developed that automate the collection of weight and mileage data on a vehicle-by-vehicle basis.

Estimates of the specific costs of administering weight distance taxes vary dramatically, and for this reason, a careful study of the cost of any proposed tax of this type should be completed before its implementation. In a 1983 study prepared for AASHTO on motor carrier taxation and registration issues, reported estimates of the administrative cost of weight distance tax systems ranged from 6 to 32 percent of collected revenue, depending on the source of the estimate (Sydec and Hovey, 1983). Colorado estimated the cost of collection of its rigorous weight and distance tax (which has been repealed) at 18 percent of collected revenue (Hulls, 1992). A 1987 study on third structure taxes conducted by the Battelle Memorial Institute in Columbus Ohio (note that Battelle was unable to locate or identify this study when contacted in the course of this work) reportedly indicated a variation in administrative costs for weight distance taxes of between 0.8 and 8 percent of collected revenue for eight weight-distance states (Maine DOT, 1990). Alternatively, estimated costs of administering a weight only based tax ranged from 1 to 14 percent of collected revenues (Sydec and Hovey, 1983).

From a practical perspective, it is important to note that the IRP presently will not recognize and process weight distance taxes (Ala, 1992). Thus, weight distance states that belong to the IRP are only able to collect registration fees through the IRP. Montana is committed to retaining IRP membership for the benefits such membership offers to both Montana vehicle operators and the state of Montana. Furthermore, under the federal Intermodal Surface Transportation Efficiency Act of 1991, Montana will be unable to collect road user fees from non-resident trucks past 1995 unless Montana is a member of the IRP.

The explicit weight and distance form of collection of the gross weight fee discussed herein is generally similar in form to that used in Oregon, although Oregon offers separate schedules for vehicles that pay Oregon fuel taxes and those that do not pay Oregon fuel taxes. The weight distance tax investigated for Montana is approximately 35 percent of the tax imposed in Oregon (based on 1987 tax rate in Oregon (Oregon, 1986)).

Colorado replaced its tax system based on the weight and specific mileage travelled by a vehicle with a simplified tax schedule based on weight and category of distance traveled annually by a vehicle (i.e., less than 2,500; 2501 to 9999; 10000 to 30000; and over 30000 miles annually) (Hulls, 1992; Colorado Department of Highways and Department of Revenue, 1990). All interstate carriers are subject to the highest schedule. The magnitude of the weight distance tax discussed herein appears reasonable compared to the Colorado system, when the fuel tax differential between the two states is also considered. Colorado estimated that collection and enforcement costs dropped from 18 to less than 8 percent of receipts when they repealed their "rigorous" weight and distance tax in favor of their present simplified system (Hulls, 1992).

CONCLUSIONS

Summary and Conclusions

At a broad level, the present system for financing Montana's state highways equitably charges users for the cost of providing them with highway service; insufficient annual revenue is being generated, however, to meet expenditures. Approaches were investigated in this study to improve equity in user payments, increase revenue, and generally improve the efficiency of the finance system (notably with regard to gross weight fee system). The study began with a review of the sources of income for the highway system, which include fuel taxes, gross weight fees, sales taxes on new vehicles, interest on investments and from the Coal Tax Trust fund, and miscellaneous accounts receivable. These various sources of income were found to be consistent with those used in other states to finance their highway systems and to be consistent with the concept that the highway system should be largely financed by its users. Note that this study considered only state expenditures on the highway system, and that the impact of the federal Intermodal Surface Transportation Efficiency Act of 1991 on future funding requirements was not addressed.

With regard to equity, equity ratios of 0.96, 1.11, and 1.07, respectively, were calculated for basic, intermediate, and heavy vehicles in a recently completed cost allocation study for the Montana state highway system. Upon closer inspection, large inequities appear to exist in user payments between the vehicle configurations within each of these broad categories. The largest disparities in equity occur in the heavy vehicle category, with equity ratios for configurations in this category ranging from 0.70 to 3.46. These inequities will be difficult to eliminate using a simple weight based gross weight fee structure. A review of the gross weight fee system revealed that the special fees granted particular types of vehicles and vehicles engaged in certain activities under the present system are generally inequitable. The special fees are lower than justified based on a study of road use characteristics of special fee versus full fee paying vehicles.

Equity and efficiency of the gross weight fee system would be improved if a power unit based fee system were adopted. Presently, gross weight fees can be, and often are, paid independently on the power unit and trailers comprising a combination unit. Thus, full fees may be paid on trailers that are idle much of the time. The majority of states employ power unit based gross weight fee structures. The adoption of such a system by Montana may be essential for continued participation in the International Registration Plan, a plan designed to facilitate the payment and collection of weight related use fees from interstate vehicle operators. A power unit based fee schedule was proposed herein, generally designed to generate similar fees to those charged under the present fee schedule.

With regard to increasing revenue, adjustments to the finance system were explored that would simultaneously increase revenue and improve equity between users. Approaches considered included raising the new vehicle sales tax 400 percent, raising the gasoline fuel tax (but not the special fuel tax) 22.5 percent, and raising all fuel taxes while simultaneously lowering gross weight fees. All three approaches successfully generated sufficient revenue on an annual basis to meet annual expenditures, and they produced general improvement in the overall equity of user payments. All three approaches, however, had only nominal effect on the disparity of the equity ratios for individual vehicle configurations.

Over the long term, consideration should be given to more basic revisions in the road user fee structure. One system proposed herein, that would improve equity between the broad vehicle categories and at least within the basic vehicle category is to eliminate the new vehicle sales tax, implement a fixed annual fee for passenger cars ($40), raise gasoline and special fuel taxes by the same amount (to $0.285 per gallon), and revise the gross weight fee system. Gross weight fees would be eliminated on vehicles with weights less than 48,000 pounds. Vehicles with gross weights greater than 48,000 pounds would pay a power unit based weight or weight distance tax. Before implementing a program of this nature, more careful study should be done of its cost of administration, impact on users, and possible changes in revenue than was performed herein.

Recommendations for Future Work

The cost allocation model of the Montana state highway finance system developed in these studies can be modified and updated as required to evaluate the impact of proposed changes to the finance system on the equity of user contributions. Such analyses can be performed on any specific proposals made by the Department of Transportation or the state legislature to adjust the financial situation. These proposals probably will reflect the direction highway expenditures are expected to move in, as well as the political realities involved in collecting the revenue to support these expenditures.

REFERENCES

Ala, Marcia (1992), personal communication, Motor Carrier Services Division, Montana Department of Transportation, Helena, Montana.

Arkansas IRP Unit (1992), personal communication, IRP Unit, Office of Motor Vehicles, State of Arkansas.

Bureau of the Census (1990), "1987 Census of Transportation, Truck Inventory and Use Survey," TC87-T-27 and -52, Bureau of the Census, U.S. Department of Commerce, U.S. Government Printing Office, Washington, D.C.

Colorado Department of Highways and Department of Revenue (1990), "Digest of Colorado Truck Regulations."

Federal Highway Administration (FHWA, 1988), "Highway Taxes and Fees, How they are Collected and Distributed," FHWA-PL-88-017, Federal Highway Administration, U.S. Dept. of Transportation.

Federal Highway Administration (FHWA, 1990), "Highway Statistics 1990," Washington, D.C.

Galt, David (1992), personal communication, Motor Carrier Services Division, Montana Department of Transportation, Helena, Montana.

Gosnell, W. (1992), personal communication, Chief of Administrative Services, Department of Motor Vehicles, State of Nevada..

Hall, et.al. (1956), "Financing Modern Highways for Montana," prepared for the Montana Fact Finding Committee on Highways, Streets and Bridges, Helena, Montana.

Highway Users Federation (1992), "Mobility Matters," June 1992.

Hulls, Larry (1992), personal communication, Deputy Director for Vehicle Services, Motor Vehicle Division, Department of Revenue, State of Colorado.

Maine Department of Transportation (1989), "Maine Highway Cost Allocation Study," Maine Department of Transportation.

Montana Code Annotated (1991), Montana Legislative Council, State of Montana, Helena, Montana.

Montana Department of Transportation (1991a), "Combined Working Cash Flow - Hwy Special Revenue Funds," Montana Department of Transportation, Helena, Montana.

Montana Department of Transportation (1991b), "Federal Aid Road Log," prepared by the Montana Department of Transportation, Helena, Montana.

Nevada Department of Transportation (1986), "Highway Cost Allocation Study, 1986."

New Mexico Taxation and Revenue Department (1990), "Truckers Guide."

Ohio Bureau of Permits (1992), personal communication, Bureau of Permits, Ohio Department of Transportation, State of Ohio.

Oregon Department of Transportation (1986), "Motor Vehicle Cost Responsibility Study 1986," Economics Unit, Planning Section, Highway Division.

Stephens, J.E., Barth, T., and Cloud, W. (1992), "Cost Allocation Study for the Montana Highway System," prepared by the Department of Civil and Agricultural Engineering, Montana State University, Bozeman, Montana and the Montana Department of Transportation, Helena, Montana.

Sydec (1990), "Highway Cost Allocation Study," prepared in association with the Urban Institute for the Vermont Legislature, Reston, Virginia.

Sydec (1987), "Highway Cost Allocation Study," prepared for the California Department of Transportation.

Sydec and Hovey, H. A. (1983), "AASHTO Study of Motor Carrier Taxation and Registration Issues," Final Report to the American Association of State Highway and Transportation Officials, System Design Concepts, Inc., One Farragut Square South, Washington, D.C.

Traffic Data Collection Section, MDT (1992), personnel communication of traffic data collected for the Cost Allocation Study for the Montana State Highway System, july 1992.

Wilbur Smith and Associates (1980), "Wyoming User Fee Study," submitted to the Joint Transportation and Highways Interim Committee, Wyoming State Legislature.

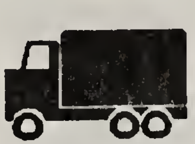
Wyoming Overweight Loads Office (1992), personal communication, Overweight Loads Office, Wyoming State Highway Department, Cheyenne, Wyoming.

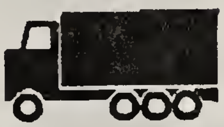
Appendix A

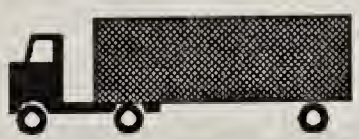
Description of Vehicle Configurations

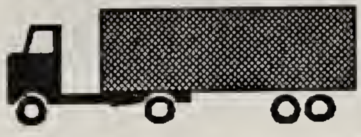
The configurations used in this study to describe various vehicles in the traffic stream are described in this Appendix. These configurations were selected to be consistent with those configurations used by the Montana Department of Transportation in collecting traffic data.

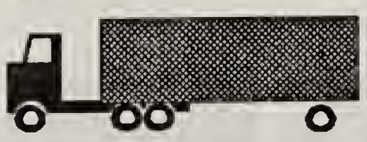
VEHICLE CONFIGURATIONS

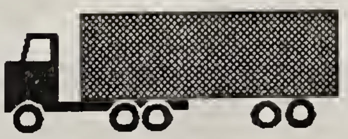
3 Axle Single Unit 3A


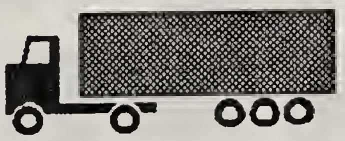
4 Axle Single Unit 4A


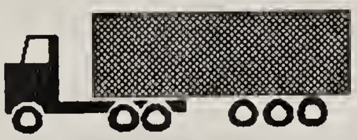
3 Axle Semi 2S1


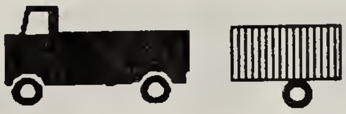
4 Axle Semi 2S2


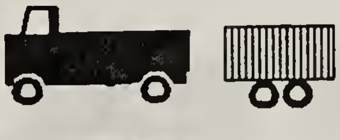
3S1


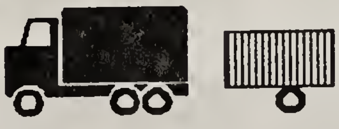
5 Axle Semi 3S2


2S3


6 Axle Semi 3S3


3 Axle Trk, Full Tr 2-1


4 Axle Trk, Full Tr 2-2


3-1


[illegible] LIBRARY

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

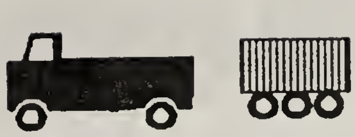
[illegible]

[illegible]

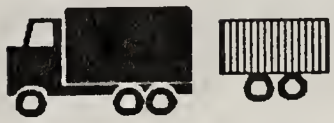
[illegible]

[illegible]

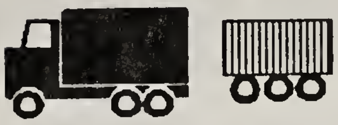
5 Axle Trk, Full Tr 2-3



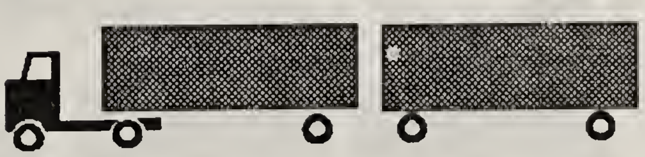
3-2



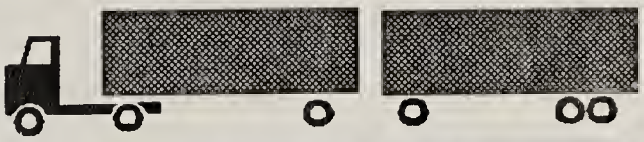
6 Axle Trk, Full Tr 3-3



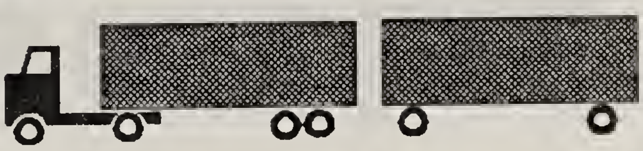
5 Axle Semi, Full Tr 2S1-2



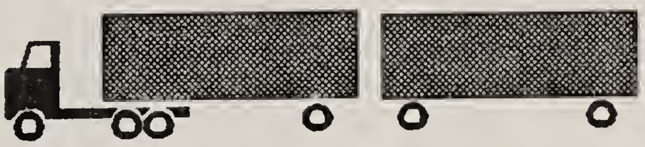
6 Axle Semi, Full Tr 2S1-3



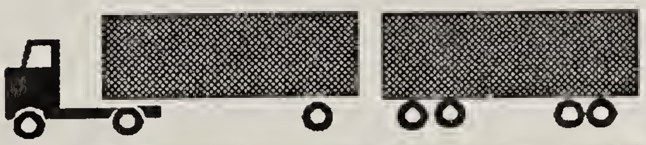
2S2-2



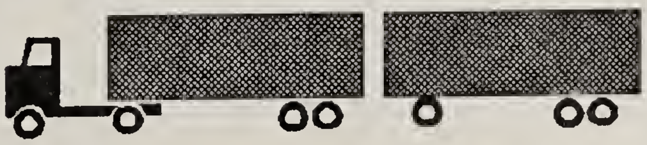
3S1-2



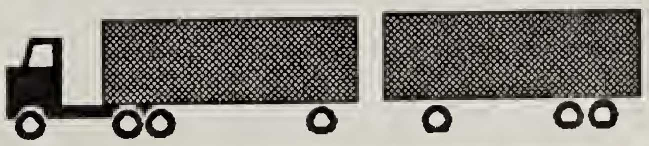
7 Axle Semi, Full Tr 2S1-4



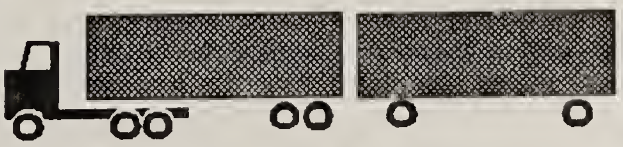
2S2-3



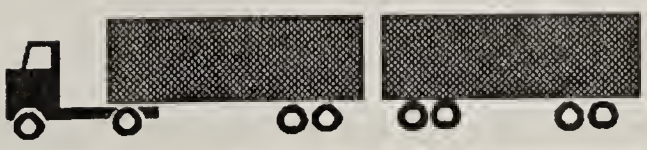
3S1-3



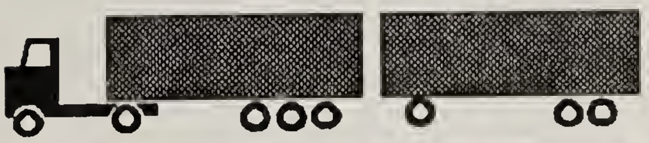
3S2-2



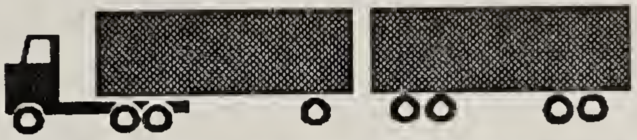
8+ Axle Semi, Full Tr 2S2-4



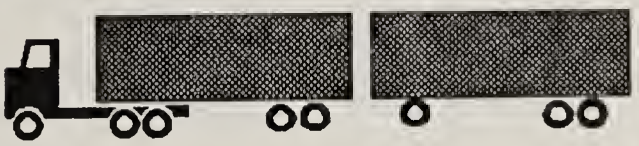
2S3-3



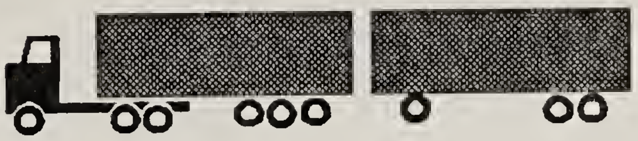
3S1-4



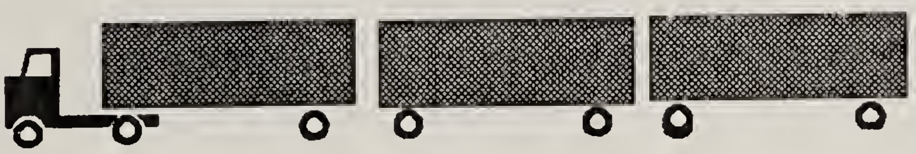
3S2-3



3S3-3



7+ Axle Triple



[illegible] [illegible]

[illegible] [illegible]

[illegible] [illegible]

[illegible] [illegible]

[illegible] [illegible]

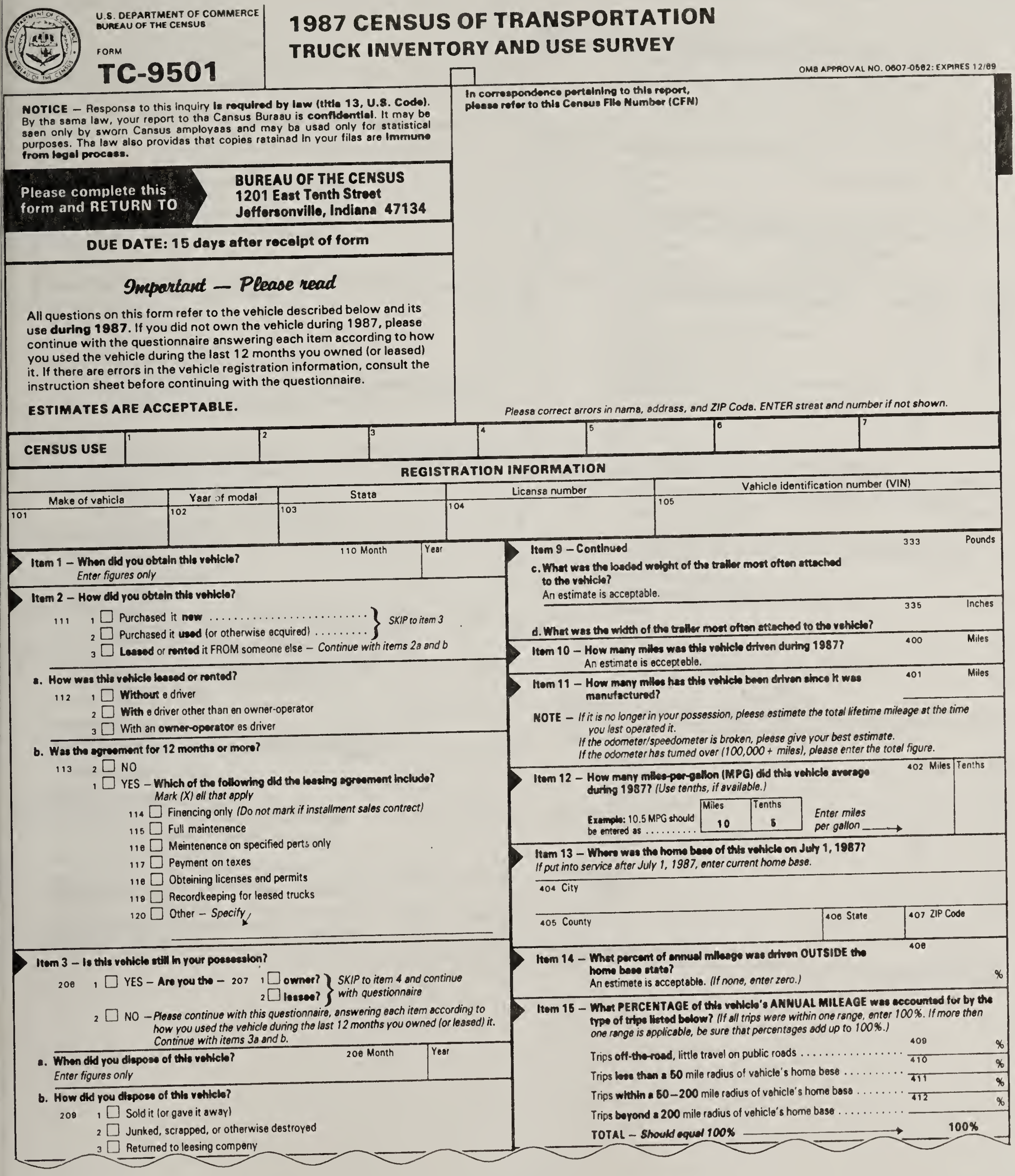
[illegible] [illegible]

Appendix B

Truck Inventory and Use Survey Questionnaire

This appendix contains a copy of the data collection form used by the Census Bureau for the Truck Inventory and Use Survey.

Survey Forms



U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

FORM
TC-9501

1987 CENSUS OF TRANSPORTATION
TRUCK INVENTORY AND USE SURVEY

OMB APPROVAL NO. 0607-0582: EXPIRES 12/89

NOTICE – Response to this inquiry **is required by law (title 13, U.S. Code).** By the same law, your report to the Census Bureau is **confidential**. It may be seen only by sworn Census employees and may be used only for statistical purposes. The law also provides that copies retained in your files are **immune from legal process.**

In correspondence pertaining to this report, please refer to this Census File Number (CFN)

Please complete this form and RETURN TO

BUREAU OF THE CENSUS
1201 East Tenth Street
Jeffersonville, Indiana 47134

DUE DATE: 15 days after receipt of form

Important — Please read

All questions on this form refer to the vehicle described below and its use **during 1987**. If you did not own the vehicle during 1987, please continue with the questionnaire answering each item according to how you used the vehicle during the last 12 months you owned (or leased) it. If there are errors in the vehicle registration information, consult the instruction sheet before continuing with the questionnaire.

ESTIMATES ARE ACCEPTABLE.

Please correct errors in name, address, and ZIP Code. ENTER street and number if not shown.

CENSUS USE	1	2	3	4	5	6	7

REGISTRATION INFORMATION

Make of vehicle	Year of model	State	License number	Vehicle identification number (VIN)
101	102	103	104	105

Item 1 – When did you obtain this vehicle?
Enter figures only
110 Month ____ Year ____

Item 2 – How did you obtain this vehicle?
111 1 ☐ Purchased it **new** } *SKIP to item 3*
2 ☐ Purchased it **used** (or otherwise acquired) } *SKIP to item 3*
3 ☐ **Leased** or **rented** it FROM someone else – *Continue with items 2a and b*

a. How was this vehicle leased or rented?
112 1 ☐ **Without** a driver
2 ☐ **With** a driver other than an owner-operator
3 ☐ With an **owner-operator** as driver

b. Was the agreement for 12 months or more?
113 2 ☐ NO
1 ☐ YES – **Which of the following did the leasing agreement include?**
Mark (X) all that apply
114 ☐ Financing only *(Do not mark if installment sales contract)*
115 ☐ Full maintenance
116 ☐ Maintenance on specified parts only
117 ☐ Payment on taxes
118 ☐ Obtaining licenses and permits
119 ☐ Recordkeeping for leased trucks
120 ☐ Other – *Specify*

Item 3 – Is this vehicle still in your possession?
206 1 ☐ YES – **Are you the** – 207 1 ☐ **owner?** } *SKIP to item 4 and continue with questionnaire*
2 ☐ **lessee?** } *SKIP to item 4 and continue with questionnaire*
2 ☐ NO – *Please continue with this questionnaire, answering each item according to how you used the vehicle during the last 12 months you owned (or leased) it. Continue with items 3a and b.*

a. When did you dispose of this vehicle?
Enter figures only
208 Month ____ Year ____

b. How did you dispose of this vehicle?
209 1 ☐ Sold it (or gave it away)
2 ☐ Junked, scrapped, or otherwise destroyed
3 ☐ Returned to leasing company

Item 9 – Continued

c. What was the loaded weight of the trailer most often attached to the vehicle?
An estimate is acceptable.
333 ____ Pounds

d. What was the width of the trailer most often attached to the vehicle?
335 ____ Inches

Item 10 – How many miles was this vehicle driven during 1987?
An estimate is acceptable.
400 ____ Miles

Item 11 – How many miles has this vehicle been driven since it was manufactured?
401 ____ Miles

NOTE – *If it is no longer in your possession, please estimate the total lifetime mileage at the time you last operated it.*
If the odometer/speedometer is broken, please give your best estimate.
If the odometer has turned over (100,000 + miles), please enter the total figure.

Item 12 – How many miles-per-gallon (MPG) did this vehicle average during 1987? *(Use tenths, if available.)*
402 Miles ____ Tenths ____

Example: 10.5 MPG should be entered as ....

Miles	Tenths
10	5

Enter miles per gallon →

Item 13 – Where was the home base of this vehicle on July 1, 1987?
If put into service after July 1, 1987, enter current home base.
404 City
405 County | 406 State | 407 ZIP Code

Item 14 – What percent of annual mileage was driven OUTSIDE the home base state?
An estimate is acceptable. *(If none, enter zero.)*
408 ____ %

Item 15 – What PERCENTAGE of this vehicle's ANNUAL MILEAGE was accounted for by the type of trips listed below? *(If all trips were within one range, enter 100%. If more than one range is applicable, be sure that percentages add up to 100%.)*

Trips **off-the-road**, little travel on public roads	409	%
Trips **less than a 50** mile radius of vehicle's home base	410	%
Trips **within a 50–200** mile radius of vehicle's home base	411	%
Trips **beyond a 200** mile radius of vehicle's home base	412	%
TOTAL – *Should equal 100%* →		100%

TC-9501 page 1 continued

Item 4 – Did you lease or rent out this vehicle TO anyone else?

210 1 ☐ YES – *Continue with items 4a and b*
2 ☐ NO – *SKIP to item 5*

a. How was it leased or rented out?

211 1 ☐ **Without** a driver
2 ☐ **With** a driver other than an owner-operator
3 ☐ With an **owner-operator as driver**

b. Was the agreement for 12 months or more?

213 2 ☐ NO
1 ☐ YES – **Which of the following did the leasing agreement include?** *Mark (X) all that apply*

214 ☐ Financing only *(Do not mark if installment sales contract)*
215 ☐ Full maintenance
216 ☐ Maintenance on specified parts only
217 ☐ Payment of taxes
218 ☐ Obtaining licenses and permits
219 ☐ Recordkeeping for leased trucks
220 ☐ Other – *Specify*

Item 5 – What is the body type of this vehicle?

311 01 ☐ Pickup
28 ☐ Mini-van
02 ☐ Van other than mini-van
24 ☐ Utility (For example: Bronco, Blazer, Jeep, CJ-5, 7, etc.)
25 ☐ Station wagon built on truck chassis (For example: Suburban, Wagoneer, etc.)
80 ☐ Other – *If the above descriptions do not match the body type of this vehicle, please describe the body type in detail.*

Item 6 – How many axles are on this vehicle and how many of them are driving axles? *(Do not include axles on any trailers pulled.)*

a. Total number of axles on truck (include front and rear axles)

318 1 ☐ Two axles (4 tires) 3 ☐ Three axles
2 ☐ Two axles (6 tires) 4 ☐ Four or more axles

b. Number of driving (powered) axles on truck

318 1 ☐ One driving axle
2 ☐ Two driving axles
3 ☐ Three or more driving axles

Item 7 – What is the overall length of this vehicle or vehicle and trailer (if a trailer was pulled more than 50 percent of the annual miles)? *Report distance from front bumper to rear of vehicle or trailer, whichever is applicable.* 325 Feet

Item 8a – What was the average weight (empty weight plus weight of cargo) of this vehicle as it was usually operated? An estimate is acceptable. 327 Pounds

b. What percent of annual mileage did this vehicle carry no payload? 328 %

c. What percent of annual mileage did this vehicle carry payloads that –

(1) filled its maximum cargo size? 329 %

(2) weighed the maximum cargo weight? 330 %

Item 9 – During 1987, did you attach any trailers to this vehicle?

301 1 ☐ YES – *Continue with items 9a, b, c, and d below*
2 ☐ NO – *SKIP to item 10*

a. What percent of annual mileage did this vehicle pull a trailer? *If less than 50 percent, skip to item 10.* 302 %

b. How many axles were on the trailer unit which you attached most frequently to the vehicle? 303

Item 16 – Not applicable to this form.

Item 17 – What is the horsepower rating of this vehicle's engine? 341 Horsepower

Item 18 – What is the size (displacement) of this vehicle's engine? *Enter cubic inches, cubic centimeters, or liters, whichever is applicable.*

342 Cubic inches (CI) **OR** 343 Cubic centimeters (CC) **OR** 344 Liters (L)

Item 19 – What kind of fuel does this vehicle use?

345 1 ☐ Gasoline
2 ☐ Diesel
3 ☐ Liquefied petroleum gas (LPG)
4 ☐ Other – *Specify fuel*

Item 20 – Does this vehicle have any of the following? *Mark (X) all that apply.*

354 ☐ Radial tires
358 ☐ Power steering
359 ☐ Air conditioning
365 ☐ Front-wheel drive

Item 21 – Who performed the general maintenance and major overhauls on this vehicle? *Mark (X) all that apply.*

	General maintenance	**Major overhauls**
Yourself	370 ☐	378 ☐
Your company's own maintenance facilities	371 ☐	379 ☐
Dealership's service department	372 ☐	380 ☐
Leasing company	373 ☐	381 ☐
Independent garage or private mechanic (includes gasoline or service stations)	374 ☐	382 ☐
Component distributorship (engine, transmission, etc.)	375 ☐	383 ☐
No one	376 ☐	384 ☐
Other – *Specify*	377 ☐	385 ☐

Item 22a – Which of the following best describes the primary way this vehicle was operated?

501 1 ☐ BUSINESS USE – Operated by and for a private business (including self-employers) or a company; used in related activities of that business (including transportation of employees) – *SKIP to item 23*
2 ☐ PERSONAL TRANSPORTATION – Operated as a personal-use vehicle in place of an automobile for pleasure driving, travel to work, etc. (NO BUSINESS USE) – *SKIP to item 26*
3 ☐ FOR HIRE – *SKIP to item 22b*
4 ☐ DAILY RENTAL (Not motor carrier) – *SKIP to item 23*
5 ☐ MIXED

Percent business use 502 %
Percent personal use 503 %
Percent for hire (includes intercorporate hauling and trip leasing, etc.) 504 %

Complete b below

b. *If this vehicle was* ***for hire,*** *indicate below the type of for hire operation. Enter percentage of mileage for each category. (See instruction sheet for further information and definitions.)*

(1) Operation type
MOTOR CARRIER 506 %
OWNER OPERATOR
as an independent 507 %
leased to a company 508 %

(2) Jurisdiction served
INTERSTATE 509 %
INTRASTATE 510 %
LOCAL 511 %

(3) Kind of carrier
CONTRACT 512 %
COMMON 513 %
EXEMPT 514 %

(4) Was this vehicle operated under ICC authority? 518 1 ☐ YES 2 ☐ NO

Continue on reverse →

C4

01 page 2

– **Which of the following best describes your business (or the part of your business in which the vehicle was used)?** *If vehicle was leased, indicate business of lessee.*

01 ☐ AGRICULTURAL ACTIVITIES (including fisheries)
02 ☐ FORESTRY OR LUMBERING ACTIVITIES
03 ☐ CONSTRUCTION WORK – buildings, homes, roads, structures, etc.
04 ☐ CONTRACTOR ACTIVITIES OR SPECIAL TRADES – painting, plumbing, electrical work, masonry, carpentry, etc.
05 ☐ MANUFACTURING, REFINING, OR PROCESSING ACTIVITIES
06 ☐ WHOLESALE TRADE
07 ☐ RETAIL TRADE
08 ☐ BUSINESS AND PERSONAL SERVICES – used to assist in such services as lodging operations, landscaping, repair (except plumbing, electrical work, etc. – *See "Contractor Activities"*), laundry, advertising, entertainment, etc.
09 ☐ UTILITIES – Used to assist in operation or service of public utilities (telephone, gas, electric, etc.)
10 ☐ MINING OR QUARRY ACTIVITIES (includes well drilling) – used to assist in the extraction of natural resources or in hauling to processors
11 ☐ DAILY RENTAL – rented out, without a driver, to someone else on a daily or short-term basis
16 ☐ ONE-WAY RENTAL
12 ☐ GOVERNMENTAL OPERATIONS
13 ☐ NOT IN USE – vehicle idle, wrecked, awaiting repair, etc., for more than 90 days
14 ☐ FOR HIRE TRANSPORTATION – including small package delivery
15 ☐ OTHER – *Please describe in detail.*

____

– From the following list of products, materials, and equipment, indicate which item or items this vehicle carried. Write in the approximate percentage of the vehicle's annual mileage that **was accounted for while carrying loads**. *(See instruction sheet for further explanation and examples.)*

ucts, equipment, materials, etc.		
GRICULTURAL AND FOOD PRODUCTS		
a) Live animals – cattle, horses, poultry, hogs, live seafood, insects, etc. . . .	526	%
b) Fresh farm products – grain, crops, flowers, nursery stock, raw milk, raw tobacco, etc. . . .	527	%
c) Processed foods and tobacco products – canned goods, prepared meats, frozen foods, beverages, bottled water, dairy products, cigarettes, etc. . .	528	%
INING PRODUCTS, UNREFINED – crude oil, coal, metal ores	529	%
UILDING MATERIALS – gravel, sand, concrete, flat glass, etc. (except cut mber – *See "Lumber."*)	530	%
ORESTRY, WOOD, AND PAPER PRODUCTS		
a) Logs and forest products – except cut lumber and fabricated wood products *(See below.)*	531	%
b) Lumber and fabricated wood products – except furniture (*See (7) below.*)	532	%
c) Paper and paper products	533	%
HEMICALS, PETROLEUM, AND ALLIED PRODUCTS		
a) Chemicals and/or drugs (including fertilizers, pesticides, cosmetics, paints, etc.)	534	%
b) Petroleum and petroleum products (including paving and roofing materials)	535	%
c) Plastics and/or rubber products	536	%
IETALS AND METAL PRODUCTS		
a) Primary metal products – pipes, ingots, billets, sheets, etc.	537	%
b) Fabricated metal products – except machinery or transportation equipment *(See below.)*	538	%
c) Machinery – electrical or nonelectrical and electronic	539	%
d) Transportation equipment (including complete vehicles) and parts	540	%
THER MANUFACTURED PRODUCTS		
a) Furniture (wood and nonwood) and/or hardware – not involved in household moving	541	%
b) Glass products	542	%
c) Textiles and apparels – fibers, leather goods, carpets, clothing, etc.	543	%
d) Miscellaneous products of manufacturing – including photographic goods, watches, clocks, jewelry, and toys	544	%
MISCELLANEOUS		
(a) Moving of household and office furniture – from home, offices, etc., under contract	545	%
(b) Miscellaneous tools and/or parts for specialized use, as in a craftsman's vehicle – traveling workshop for plumbers, carpenters, road service crews, etc.	546	%
(c) Mixed cargo, general freight (including the delivery of small packages)	547	%
(d) Scrap, garbage, trash, septic tank waste	548	%
(e) Industrial water	549	%
(f) Hazardous waste	550	%
OTHER (not elsewhere classified) – *Please describe in detail.*	551	%

Item 25 – At any time during 1987 was this vehicle (or combination) used to haul hazardous materials in quantities large enough to require a special placard placed on the vehicle due to the Code of Federal Regulations, title 49, Transportation?

552
1 ☐ YES – *Continue with items 25a and b*
2 ☐ NO – *SKIP to item 26*

a. What type(s) of hazardous materials were carried by this vehicle? *Mark (X) all that apply.*

Hazardous Materials

553 ☐ Flammable liquids
554 ☐ Combustible liquids
555 ☐ Corrosive liquids
556 ☐ Poison B solids
557 ☐ Poison B liquids
558 ☐ Flammable solids
559 ☐ Oxidizers
560 ☐ Flammable gas
561 ☐ Nonflammable gas
562 ☐ Poison A
563 ☐ Corrosive solids
564 ☐ Explosives, A or B
565 ☐ Blasting agents
566 ☐ Radioactive materials
567 ☐ ORM – A, B, or C
568 ☐ ORM E
569 ☐ Hazardous materials not listed above – *Specify*

____

b. Approximately what percent of this vehicle's annual mileage was accounted for by carrying these hazardous materials?

570
1 ☐ Below 10%
2 ☐ 10–24%
3 ☐ 25–49%
4 ☐ 50–74%
5 ☐ 75–100%

Item 26a – Was this truck or power unit involved in any accidents during 1987?

580
1 ☐ YES – *Continue with item 26b*
2 ☐ NO – *SKIP to item 27*

b. If this truck or power unit was involved in any accidents during 1987, how many –

(1) involved a fatality?	581	
(2) involved no fatalities, but involved bodily injury requiring medical treatment? . . .	582	
(3) involved property damage of $4,200 or more?	583	

Item 27 – *Please enter below the number of any ADDITIONAL trucks and/or trailers you own and/or operate at the same home base you listed in item 13.*

a. Pickups, small vans (includes mini-vans)	571	
b. Straight trucks	572	
c. Truck-tractors (power units)	573	
d. Trailers (semi- and/or full)	574	
e. Converter dollies	575	

Item 28 – *Please enter below Employer Identification (EI) Number if vehicle owned by company or Social Security Number (SSN) if vehicle owned by individual.*

EI ☐☐–☐☐☐☐☐☐☐
or
SSN ☐☐☐–☐☐–☐☐☐☐

65

TI-9501 page 2 continued

tem 29 – REMARKS – *Please use this space for any explanations that may be essential in understanding your reported data.*

tem 30 – Person to contact regarding this report
Does this person have records on (or knowledge of) the daily activities of driver (stops, weight of individual shipments, destinations of shipments, etc.)?

1 ☐ YES
2 ☐ NO

e				Address *(Number and street)*	
				State	ZIP Code
aytime telephone umber ⟶	Area code	Number	Extension, if any	If this vehicle has a fleet number, please enter it here ⟶	576

66

U.S. DEPARTMENT OF COMMERCE
BUREAU OF THE CENSUS

FORM
TC-9502

1987 CENSUS OF TRANSPORTATION
TRUCK INVENTORY AND USE SURVEY

OMB APPROVAL NO. 0607-0582: EXPIRES 12/89

IOTICE — Response to this inquiry **is required by law (title 13, U.S. Code)**. y the same law, your report to the Census Bureau is **confidential**. It may be een only by sworn Census employees and may be used only for statistical urposes. The law also provides that copies retained in your files are **immune** rom **legal process**.

In correspondence pertaining to this report, please refer to this Census File Number (CFN)

lease complete this orm and RETURN TO

BUREAU OF THE CENSUS
1201 East Tenth Street
Jeffersonville, Indiana 47134

DUE DATE: 15 days after receipt of form

Important — Please read

ll questions on this form refer to the vehicle described below and its se **during 1987**. If you did not own the vehicle during 1987, please ontinue with the questionnaire answering each item according to how ou used the vehicle during the last 12 months you owned (or leased) . If there are errors in the vehicle registration information, consult the nstruction sheet before continuing with the questionnaire.

STIMATES ARE ACCEPTABLE.

Please correct errors in name, address, and ZIP Code. ENTER street and number if not shown.

ENSUS USE	1	2	3	4	5	6	7

REGISTRATION INFORMATION

Make of vehicle	Year of model	State	License number	Vehicle identification number (VIN)
10	102	103	104	105

tem 1 — When did you obtain this vehicle? 110 Month ____ Year ____
Enter figures only

tem 2 — How did you obtain this vehicle?

111
1 ☐ Purchased it **new** .... } *SKIP to item 3*
2 ☐ Purchased it **used** (or otherwise acquired) .... }
3 ☐ **Leased** or **rented** it FROM someone else — *Continue with items 2a and b*

. How was this vehicle leased or rented?

112
1 ☐ **Without** a driver
2 ☐ **With** a driver other than an owner-operator
3 ☐ With an **owner-operator** as driver

. Was the agreement for 12 months or more?

113
2 ☐ NO
1 ☐ YES — **Which of the following did the leasing agreement include?**
Mark (X) all that apply
- 114 ☐ Financing only *(Do not mark if installment sales contract)*
- 115 ☐ Full maintenance
- 116 ☐ Maintenance on specified parts only
- 117 ☐ Payment on taxes
- 118 ☐ Obtaining licenses and permits
- 119 ☐ Recordkeeping for leased trucks
- 120 ☐ Other — *Specify*

tem 3 — Is this vehicle still in your possession?

206
1 ☐ YES — **Are you the —** 207 1 ☐ **owner?** } *SKIP to item 4 and continue with questionnaire*
2 ☐ **lessee?**
2 ☐ NO — *Please continue with this questionnaire, answering each item according to how you used the vehicle during the last 12 months you owned (or leased) it. Continue with items 3a and b.*

. When did you dispose of this vehicle? 208 Month ____ Year ____
Enter figures only

. How did you dispose of this vehicle?

209
1 ☐ Sold it (or gave it away)
2 ☐ Junked, scrapped, or otherwise destroyed
3 ☐ Returned to leasing company

Item 8 — *Please indicate the body type which most closely resembles this vehicle or the trailer most often attached to it, if the power-unit is a truck-tractor.*

311

PLATFORM TYPES
- 05 ☐ Low boy (gooseneck) — platform with depressed center
- 06 ☐ Basic platform — including flatbed, stake, etc.
- 04 ☐ Platform with devices permanently mounted on bed of truck — such as high lift, lift gate, hoist, etc.

VAN TYPES
- 03 ☐ Multistop or step van (including hi-cube or cutaway)
- 12 ☐ Basic enclosed van (dry cargo)
- 10 ☐ Drop frame van — including furniture van, etc.
- 08 ☐ Insulated, non-refrigerated van
- 09 ☐ Insulated, refrigerated van
- 11 ☐ Open top van, including fruit

SPECIALIZED USE TRUCKS
- 18 ☐ Automobile transport
- 13 ☐ Beverage truck
- 70 ☐ Concrete mixer
- 40 ☐ Dump truck (including belly or bottom dump)
- 29 ☐ Grain bodies (including low-side grain and hoppers, etc.)
- 30 ☐ Garbage truck
- 07 ☐ Livestock truck (including livestock drop frame)
- 27 ☐ Oilfield truck — service equipment permanently mounted on vehicle
- 17 ☐ Pole, logging, pulpwood, or pipe truck
- 22 ☐ Service truck or "craftsman's vehicle" — body equipped for mobile repair and service
- 60 ☐ Tank truck for dry bulk
- 50 ☐ Tank truck for liquids or gases
- 14 ☐ Utility truck — used in public utility operations (telephone line truck, etc.), body equipped for major repair (may have aerial lift, derrick, etc.)
- 15 ☐ Winch or crane truck — lifting equipment (including roll on, roll off) permanently mounted on vehicle
- 16 ☐ Wrecker — for motor vehicle towing or lifting
- 23 ☐ Yard tractor — cab and chassis ONLY, used to spot trailers

NOTE — *If none of the above descriptions match the body type of this vehicle, or the trailer usually attached to it, mark (X) the "Other" box below and specify type.*

80 ☐ Other — *Specify*

C-9502 page 1 continued

Item 4 — Did you lease or rent out this vehicle TO anyone else?

210 1 ☐ YES — *Continue with items 4a and b*
2 ☐ NO — *SKIP to item 5*

a. How was it leased or rented out?

211 1 ☐ **Without** a driver
2 ☐ **With** a driver other than an owner-operator
3 ☐ With an **owner-operator as driver**

b. Was the agreement for 12 months or more?

213 2 ☐ NO
1 ☐ YES — **Which of the following did the leasing agreement include?**
Mark (X) all that apply

214 ☐ Financing only *(Do not mark if installment sales contract)*
215 ☐ Full maintenance
216 ☐ Maintenance on specified parts only
217 ☐ Payment of taxes
218 ☐ Obtaining licenses and permits
219 ☐ Recordkeeping for leased trucks
220 ☐ Other — *Specify*

Item 5 — How would you best describe this vehicle as it was most often operated? *(If the vehicle is a pickup, compact van, mini-van, or panel truck, enter body type on the "Other" line.)*

300 1 ☐ Straight truck
2 ☐ Straight truck pulling trailer(s)
3 ☐ Truck-tractor (power unit) pulling trailer(s)
4 ☐ Other — *Specify*

Item 6 — If you indicated in item 5 that you operated this vehicle with trailer(s) attached, indicate below the kind of trailer(s) you **most often pulled**. *Mark (X) one box only, also indicate if axles are liftable.*

a. Utility and other trailers less than 20 feet used with **straight truck**

304 1 ☐ One axle on trailer
2 ☐ Two axles on trailer
3 ☐ Three axles or more on trailer

b. One full trailer *used with **straight truck**

305 1 ☐ Two axles on trailer
2 ☐ Three axles on trailer
3 ☐ Four or more axles on trailer

How many, IF ANY, of the trailer's axles are liftable? → 306

c. One semi-trailer, used with **truck-tractor** (power unit)

307 1 ☐ One axle on trailer
2 ☐ Two axles on trailer
3 ☐ Three or more axles on trailer

How many, IF ANY, of the trailer's axles are liftable? → 306

d. Two trailers, one semi- and one full *used with **truck-tractor** (power unit)

308 1 ☐ Three axles on two trailers
2 ☐ Four axles on two trailers
3 ☐ Five axles on two trailers
4 ☐ Six or more axles on two trailers

How many, IF ANY, of the trailer's axles are liftable? → 306

e. Three trailers, one semi- and two full *used with **truck-tractor** (power unit)

309 1 ☐ Five axles on three trailers
2 ☐ Six axles on three trailers
3 ☐ Seven axles on three trailers
4 ☐ Eight or more axles on three trailers

How many, IF ANY, of the trailer's axles are liftable? → 306

f. Other — *Please describe in detail the number of trailers and axles on those trailers. Also give number of any liftable axles on trailer(s).*

310

Item 7 — If you indicated in item 5 that you operated a truck-tractor (power unit) pulling trailer(s), what percent of annual mileage did you haul —

a. Railroad, ocean-going, or similar containers? .... 312 %
b. Piggyback trailers? .... 313 %

emi-trailer with converter dolly

Item 9 — How many axles are on this vehicle and how many of them are driving axles? *(Do not include axles on any trailers pulled.)*

a. Total number of axles on **truck** or **truck-tractor** (power unit) *(Include front and rear axles.)*

316 1 ☐ Two axles (4 tires)
2 ☐ Two axles (6 tires)
3 ☐ Three axles
4 ☐ Four or more axles

How many, IF ANY, are liftable axles? → 317

b. Number of driving (powered) axles on **truck** or **truck-tractor** (power unit)

318 1 ☐ One driving axle
2 ☐ Two driving axles
3 ☐ Three or more driving axles

Item 10 — What type of cab does this vehicle have?

319 1 ☐ Cab forward of engine
2 ☐ Cab over engine
3 ☐ Conventional cab
4 ☐ Cab beside engine
5 ☐ Other

Item 11a — What is the OVERALL length of this vehicle or combination as it was most often operated? *Report distance from front bumper to rear of truck or rear of the last trailer attached.* 325 Feet

b. If this is a combination vehicle, what was the width of the trailer most often attached to the truck or power unit? *(If more than one trailer was pulled, give the width of the widest trailer pulled.)* 335 Inches

Item 12 — What is the EMPTY weight (truck minus cargo) of this vehicle or vehicle/trailer combination?
An estimate is acceptable. 326 Pounds

Item 13 — What was the AVERAGE weight (empty weight plus weight of cargo) of the vehicle or vehicle/trailer combination when carrying a typical payload during the past year?
An estimate is acceptable. 327 Pounds

Item 14a — What was the MAXIMUM GROSS weight (MGW) at which this vehicle or vehicle/trailer combination was operated?
An estimate is acceptable. 334 Pounds

b. What percent of annual mileage did this vehicle carry no payload? 328 %

c. What percent of annual mileage did this vehicle carry payloads that —
(1) filled its maximum cargo size? 329 %
(2) weighed the maximum cargo weight? 330 %

Item 15 — How many miles was this vehicle driven during 1987?
An estimate is acceptable. 400 Miles

Item 16 — How many miles has this vehicle been driven since it was manufactured? 401 Miles

NOTE — *If it is no longer in your possession, please estimate the total lifetime mileage at the time you last operated it.*
If the odometer/speedometer is broken, please give your best estimate.
If the odometer has turned over (100,000+ miles), please enter the total figure.

Item 17 — How many miles-per-gallon (MPG) did this vehicle average during 1987? *(Use tenths, if available.)* 402 Miles Tenths

	Miles	Tenths
Example: 10.5 MPG should be entered as	10	5

Enter miles per gallon →

Item 18 — Where was the home base of this vehicle on July 1, 1987?
If put into service after July 1, 1987, enter current home base.

404 City

405 County

406 State

407 ZIP Code

Continue on reverse →

Item 19 – What percent of annual mileage was driven OUTSIDE the home base state? An estimate is acceptable. *(If none, enter zero.)* 408 ____ %

Item 20 – What PERCENTAGE of this vehicle's ANNUAL MILEAGE was accounted for by the type of trips listed below? *(If all trips were within one range, enter 100%. If more than one range is applicable, be sure that percentages add up to 100%.)*

Trips **off-the-road**, little travel on public roads	409	%
Trips **less than a 50** mile radius of vehicle's home base	410	%
Trips **within a 50–200** mile radius of vehicle's home base	411	%
Trips **beyond a 200** mile radius of vehicle's home base	412	%
TOTAL – *Should equal 100%* →		100%

Item 21 – Not applicable to this form.

Item 22 – What is the horsepower rating of this vehicle's engine? 341 ____ Horsepower

Item 23 – What is the size (displacement) of this vehicle's engine?
Enter cubic inches, cubic centimeters, or liters, whichever is applicable.

342 Cubic inches (CI) **OR** 343 Cubic centimeters (CC) **OR** 344 Liters (L)

Item 24 – What kind of fuel does this vehicle use?

345
1 ☐ Gasoline
2 ☐ Diesel
3 ☐ Liquefied petroleum gas (LPG)
4 ☐ Other – *Specify fuel* ____________

Item 25 – What type of brakes does the power unit (truck or truck-tractor) have?

347
1 ☐ Hydraulic (standard)
2 ☐ Hydraulic with power assist
3 ☐ Air

Item 26 – Does this vehicle have any of the following equipment?
Mark (X) all that apply.

350 ☐ Aerodynamic features
351 ☐ Axle or drive ratio to maximize fuel efficiency
352 ☐ Fuel economy engine with low RPM, high torque rise, turbo-charge, etc.
353 ☐ Reflective materials (in addition to those required by law)
354 ☐ Radial tires
355 ☐ Road speed governor
356 ☐ Variable fan drives
357 ☐ Other fuel conservation features
358 ☐ Power steering
359 ☐ Air conditioning in cab
360 ☐ Engine retarder
361 ☐ Electronic vehicle management system
362 ☐ Electronic vehicle identification device (transponder), etc.
363 ☐ Trip recorders
364 ☐ Navigational systems

Item 27 – Who performed the general maintenance and major overhauls on this vehicle? *Mark (X) all that apply*

	General maintenance	Major overhauls
Yourself	370 ☐	378 ☐
Your company's own maintenance facilities	371 ☐	379 ☐
Dealership's service department	372 ☐	380 ☐
Leasing company	373 ☐	381 ☐
Independent garage or private mechanic (includes gasoline or service stations)	374 ☐	382 ☐
Component distributorship (engine, transmission, etc.)	375 ☐	383 ☐
No one	376 ☐	384 ☐
Other – *Specify* ____________	377 ☐	385 ☐

Item 30 – From the following list of products, materials, and equipment, indicate which item or items this vehicle carried. Write in the approximate percentage of the vehicle's annual mileage that **was accounted for while carrying loads**. *(See instruction sheet for further explanation and examples.)*

Products, equipment, materials, etc.		
(1) AGRICULTURAL AND FOOD PRODUCTS		
(a) Live animals – cattle, horses, poultry, hogs, live seafood, insects, etc.	526	%
(b) Fresh farm products – grain, crops, flowers, nursery stock, raw milk, raw tobacco, etc.	527	%
(c) Processed foods and tobacco products – canned goods, prepared meats, frozen foods, beverages, bottled water, dairy products, cigarettes, etc.	528	%
(2) MINING PRODUCTS, UNREFINED – crude oil, coal, metal ores	529	%
(3) BUILDING MATERIALS – gravel, sand, concrete, flat glass, etc. (except cut lumber – *See "Lumber."*)	530	%
(4) FORESTRY, WOOD, AND PAPER PRODUCTS		
(a) Logs and forest products – except cut lumber and fabricated wood products *(See below.)*	531	%
(b) Lumber and fabricated wood products – except furniture *(See (7) below.)*	532	%
(c) Paper and paper products	533	%
(5) CHEMICALS, PETROLEUM, AND ALLIED PRODUCTS		
(a) Chemicals and/or drugs (including fertilizers, pesticides, cosmetics, paints, etc.)	534	%
(b) Petroleum and petroleum products (including paving and roofing materials)	535	%
(c) Plastics and/or rubber products	536	%
(6) METALS AND METAL PRODUCTS		
(a) Primary metal products – pipes, ingots, billets, sheets, etc.	537	%
(b) Fabricated metal products – except machinery or transportation equipment *(See below.)*	538	%
(c) Machinery – electrical or nonelectrical and electronic	539	%
(d) Transportation equipment (including complete vehicles) and parts	540	%
(7) OTHER MANUFACTURED PRODUCTS		
(a) Furniture (wood and nonwood) and/or hardware – not involved in household moving	541	%
(b) Glass products	542	%
(c) Textiles and apparels – fibers, leather goods, carpets, clothing, etc.	543	%
(d) Miscellaneous products of manufacturing – including photographic goods, watches, clocks, jewelry, and toys	544	%
(8) MISCELLANEOUS		
(a) Moving of household and office furniture – from home, offices, etc., under contract	545	%
(b) Miscellaneous tools and/or parts for specialized use, as in a craftsman's vehicle – traveling workshop for plumbers, carpenters, road service crews, etc.	546	%
(c) Mixed cargo, general freight (including the delivery of small packages)	547	%
(d) Scrap, garbage, trash, septic tank waste	548	%
(e) Industrial water	549	%
(f) Hazardous waste	550	%
(9) OTHER (not elsewhere classified) – *Please describe in detail* ____________	551	%

Item 31 – At any time during 1987 was this vehicle (or combination) used to haul hazardous materials in quantities large enough to require a special placard placed on the vehicle due to the Code of Federal Regulations, title 49, Transportation?

552
1 ☐ YES – *Continue with items 31a and b*
2 ☐ NO – *SKIP to item 32*

a. What type(s) of hazardous materials were carried by this vehicle? *Mark (X) all that apply.*

Hazardous Materials

553 ☐ Flammable liquids
554 ☐ Combustible liquids
555 ☐ Corrosive liquids
556 ☐ Poison B solids
557 ☐ Poison B liquids
558 ☐ Flammable solids
559 ☐ Oxidizers
560 ☐ Flammable gas
561 ☐ Nonflammable gas
562 ☐ Poison A
563 ☐ Corrosive solids
564 ☐ Explosives, A or B
565 ☐ Blasting agents
566 ☐ Radioactive materials
567 ☐ ORM – A, B, or C
568 ☐ ORM E
569 ☐ Hazardous materials not listed above – *Specify* ____________

b. Approximately what percent of this vehicle's annual mileage was accounted for by carrying these hazardous materials?

570
1 ☐ Below 10%
2 ☐ 10–24%
3 ☐ 25–49%
4 ☐ 50–74%
5 ☐ 75–100%

TC-9502 page 2 continued

Item 28a – Which of the following best describes the primary way this vehicle was operated?

501 1 ☐ BUSINESS USE – Operated by and for a private business (including self-employers) or a company; used in related activities of that business (including transportation of employees) – *SKIP to item 29*

2 ☐ PERSONAL TRANSPORTATION – Operated as a personal-use vehicle in place of an automobile for pleasure driving, travel to work, etc. (NO BUSINESS USE) – *SKIP to item 32*

3 ☐ FOR HIRE – *SKIP to item 28b*

4 ☐ DAILY RENTAL OR SHORT TERM LEASE – Rented or leased out to various operators and for various activities, under daily or short term rental or lease agreements (Not motor carrier) – *SKIP to item 29*

5 ☐ MIXED

Percent business use .... 502 ____ %

Percent personal use .... 503 ____ %

Percent for hire (includes intercorporate hauling and trip leasing, etc.) .... 504 ____ %

Complete b below

b. *If this vehicle was **for hire**, indicate below the type of for hire operation. Enter percentage of mileage for each category.*

(1) Operation type

MOTOR CARRIER – Operated by a company whose primary business is to provide transportation services, carrying freight belonging to others .... 506 ____ %

OWNER/OPERATOR – Operated by an independent trucker who drives vehicle for himself or on lease to a company –

as an independent .... 507 ____ %

leased to a company .... 508 ____ %

(2) Jurisdiction served

INTERSTATE .... 509 ____ %

INTRASTATE .... 510 ____ %

LOCAL – In a single municipality, contiguous municipalities or a municipality and its suburban area; in commercial zones .... 511 ____ %

(3) Kind of carrier

CONTRACT – Offered transportation service to certain shippers under contracts .... 512 ____ %

COMMON – Offered transportation service to the general public over regular or irregular routes .... 513 ____ %

EXEMPT – transported commodities or provided types of services that were exempt from Federal regulation; operated within exempt commercial zones .... 514 ____ %

(4) Was this vehicle operated under ICC authority? .... 518 1 ☐ YES 2 ☐ NO

Item 29 – Which of the following best describes your business or the part of your business in which the vehicle was used? *If the vehicle was leased, indicate business of lessee.*

525 01 ☐ AGRICULTURAL ACTIVITIES (including fisheries)

02 ☐ FORESTRY OR LUMBERING ACTIVITIES

03 ☐ CONSTRUCTION WORK – buildings, homes, roads, structures, etc.

04 ☐ CONTRACTOR ACTIVITIES OR SPECIAL TRADES – painting, plumbing, electrical work, masonry, carpentry, etc.

05 ☐ MANUFACTURING, REFINING, OR PROCESSING ACTIVITIES

06 ☐ WHOLESALE TRADE

07 ☐ RETAIL TRADE

08 ☐ BUSINESS AND PERSONAL SERVICES – used to assist in such services as lodging operations, landscaping, repair (except plumbing, electrical work, etc. – *See "Contractor Activities"*), laundry, advertising, entertainment, etc.

09 ☐ UTILITIES – Used to assist in operation or service of public utilities (telephone, gas, electric, etc.)

10 ☐ MINING OR QUARRY ACTIVITIES (includes well drilling) – used to assist in the extraction of natural resources or in hauling to processors

11 ☐ DAILY RENTAL – rented out, without a driver, to someone else on a daily or short-term basis

16 ☐ ONE-WAY RENTAL

12 ☐ GOVERNMENTAL OPERATIONS

13 ☐ NOT IN USE – vehicle idle, wrecked, awaiting repair, etc., for more than 90 days

14 ☐ FOR HIRE TRANSPORTATION – including small package delivery

15 ☐ OTHER – *Please describe in detail.*

____

Item 32a – Was this truck or power unit involved in any accidents during 1987?

580 1 ☐ YES – *Continue with item 32b*

2 ☐ NO – *SKIP to item 33*

b. If this truck or power unit was involved in any accidents during 1987, how many –

(1) involved a fatality? .... 581 ____

(2) involved no fatalities, but involved bodily injury requiring medical treatment? . 582 ____

(3) involved property damage of $4,200 or more? .... 583 ____

Item 33 – *Please enter below the number of any ADDITIONAL trucks and/or trailers you own and/or operate at the same home base you listed in item 18.*

a. Pickups, small vans (includes mini-vans) .... 571 ____

b. Straight trucks .... 572 ____

c. Truck-tractors (power units) .... 573 ____

d. Trailers (semi- and/or full) .... 574 ____

e. Converter dollies .... 575 ____

Item 34 – *Please enter below Employer Identification (EI) Number if vehicle owned by company or Social Security Number (SSN) if vehicle owned by individual.*

EI ☐☐ – ☐☐☐☐☐☐☐

or

SSN ☐☐☐ – ☐☐ – ☐☐☐☐

Item 35 – REMARKS – *Please use this space for any explanations that may be essential in understanding your reported data.*

Item 36 – Person to contact regarding this report

Does this person have records on (or knowledge of) the daily activities of driver (stops, weight of individual shipments, destinations of shipments, etc.)?

1 ☐ YES

2 ☐ NO

Name			
Address *(Number and street)*			
City		State	ZIP Code
Daytime telephone number ⟶	Area code	Number	Extension, if any
If this vehicle has a fleet number, please enter it here		576	

Appendix C
Special Fuel User Tax Return

This appendix contains a copy of the Special Fuel User Tax Return filed by most special fuel users in the state of Montana.

(Please detach your copy before completing tax return)

P.O. Box 5895
Helena, MT 59604-5895

MONTANA
DEPARTMENT OF REVENUE
MOTOR FUELS TAX DIVISION

(406) 444-3474

SPECIAL FUEL USER TAX RETURN

QUARTER ENDING

TRADE NAME (DBA) ______
ADDRESS LINE 1 ______
ADDRESS LINE 2 ______
CITY, ST, ZIP ______

LICENSE NUMBER ______
FED I.D. NO. ______
SOC. SEC. NO. ______
PHONE ( ) ______

SEE REVERSE FOR GENERAL INSTRUCTIONS

This return must be filed even if you did not operate this quarter. If you did not operate in Montana this quarter, write NONE on line 1 and do not complete the remainder of return.

If Schedule 1 is completed omit lines 1 through 6.

1. Miles operated in all jurisdictions .... ______ Miles
2. Total fuel used in all operations (Do not include fuel reported on MF-15) .... ______ Gallons
3. Average miles per gallon (Line 1 divided by line 2) .... ______
4. Total Montana miles .... ______ Miles
5. Montana non-taxable miles (Private or Forest Service property) ______ Miles
6. Miles taxable in Montana only (Subtract line 5 from line 4) ...... ______ Miles

7. Total fuel used in Montana (Line 6 divided by line 3) or (Schedule 1 Total) .... ______ Gallons
8. Tax liability (Multiply line 7 by $.20) .... $ ______
9. Contractor amount due (Attach Schedule MF15) .... $ ______
10. Compressed natural gas amount due (Attach Schedule) .... $ ______
11. Total tax liability (Add lines 8, 9 and 10) .... $ ______
12. Total tax paid fuel purchased in Montana (Do not include tax paid purchases from MF15) ______ Gallons
13. Credit for total tax paid fuel purchases in Montana (Multiply line 12 by $.20) .... $ ______
14. If Line 13 is larger than Line 11, enter **Credit** (See General Instructions) $ ______
15. If Line 11 is larger than Line 13, enter **TAX DUE** .... $ ______
16. Penalty ($25.00 or 10% of tax due, whichever is greater) . . . $ ______
17. Interest (1% of tax due per month or fraction thereof) ...... $ ______
18. Credit from prior quarters .... $ ______
19. TOTAL AMOUNT DUE (Add line 15, 16 and 17, Subtract line 14 and 18) .... $ ______
(make remittance payable to Department of Revenue)

I declare, under penalties of perjury, that this return (including any schedules) has been examined by me and to the best of my knowledge and belief is true, correct and complete.

Check here to cancel your DIESEL Users License
CANCEL ☐
DATE ______
SEE INSTRUCTIONS

FORMS NEEDED
MF12 ☐
MF12A ☐
MF15 ☐
COMPRESSED NATURAL GAS ☐

______
(SIGNATURE OF AUTHORIZED AGENT)

______ TITLE
______ DATE

MDT Library
3 9526 01019454 5